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ABSTRACT

This document contains four papers examining trends in the development of training and the role of innovation as a transferable practice. "Review of the Issue" (Anne de Blignieres-Legeraud) examines the vocational training systems of Portugal and France to identify how changes in training systems have affected trainer profiles and how transfer of innovations can be organized to benefit the European Community. "Training of Trainers in a Changing Socioeconomic Context" (Eduardo Augusto Peres Fonesca) considers the impact of globalization on innovation and experiment in the training of trainers and training services' use of multimedia technology. "New Media and Changes in the Professional Role of the Trainer" (Pol Debaty) reports on a study that examined five hypotheses regarding the new roles of trainers faced with the advances in information technology that have affected the field of training during the past 10 years. "Criteria and Parameters for the Identification of Innovation in the Field of New Technologies Applied to Education and Learning" (Anne de Blignieres-Legeraud) discusses a study conducted to develop a working frame of analysis that can be applied to training projects that use new technologies and that appear to be "transferable innovations" at the European level. Two papers contain substantial bibliographies. (MN)

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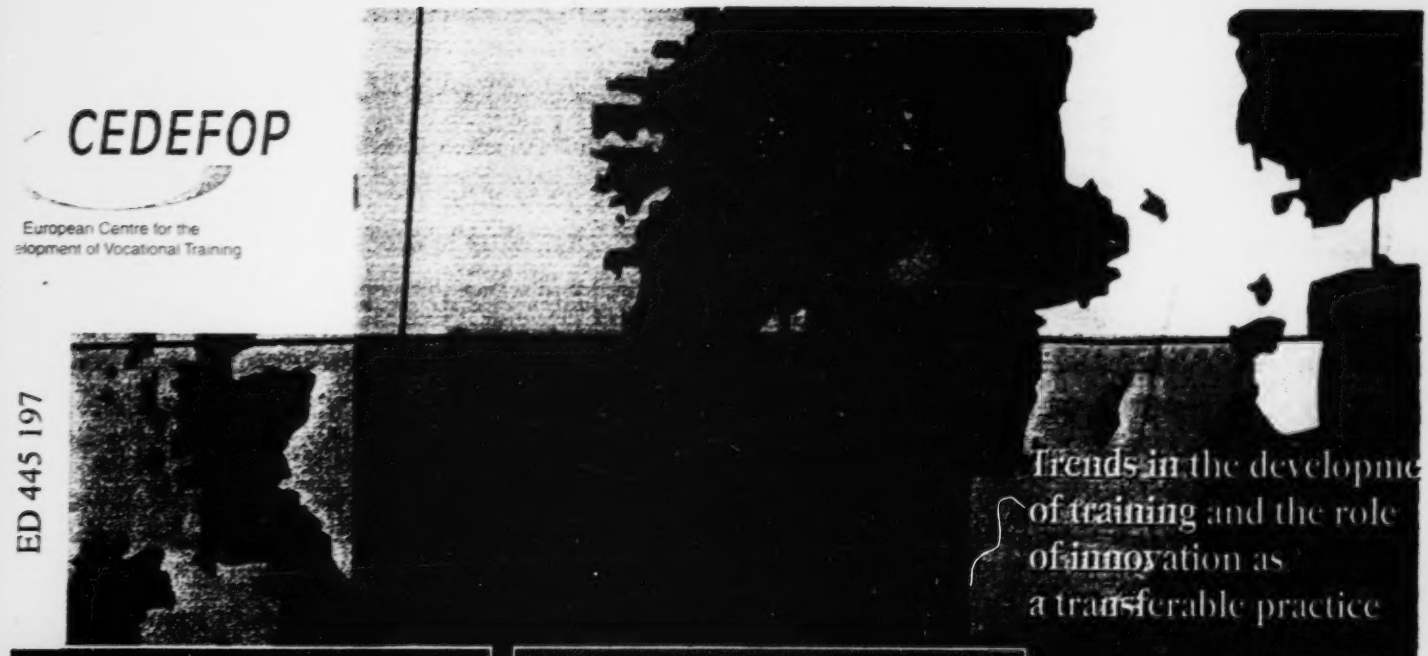

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TTnet Dossier No 1
Trends in the development of training and the role of innovation as a transferable practice

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Preface

In 1998 Cedefop created the *Training of Trainers network* (TTnet) as a Community forum for communication, cooperation and expertise in the field of training for teachers and trainers of vocational training. This forum focuses on innovation and seeks to meet real needs from a 'market' perspective.

The forum is based on the existence of active networks engaged in common activities (workshops and studies), and especially work designed to promote exchanges of information and experiences (CD-ROMs, studies and dossiers).

The publication of the *TTnet Dossiers* thus has two aims:

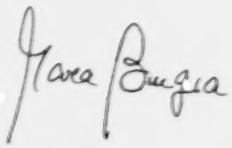
- to pinpoint the various issues surrounding the professionalisation of those involved in training in the Member States;
- to promote training for trainers as a subject of discussion within the context of the creation of a European education and training area.

The TTnet Dossiers are intended to ensure that the outcomes of the various projects conducted by the TTnet are available to the different players in the field of the training of trainers: policy-makers, research and documentation centres, and trainers' professional bodies, thereby contributing to the Community debate about the training of trainers.

The ultimate aim is to make a contribution to the production of common points of reference for the professionalisation of teachers and trainers of vocational training.

Each Dossier brings together, for a given theme, a text setting out the issue by outlining how the network has discussed it, and specific contributions made by experts at workshops, or studies conducted by the network.

Dossier No 1 on the development of training professions and the role of innovation as a transferable practice brings together different works – presentations and studies – carried out as part of the TTnet network's activities during the period 1998-2000. The works were selected for their topicality and for their contribution to the Community debate on the theme of this first Dossier.



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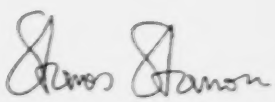

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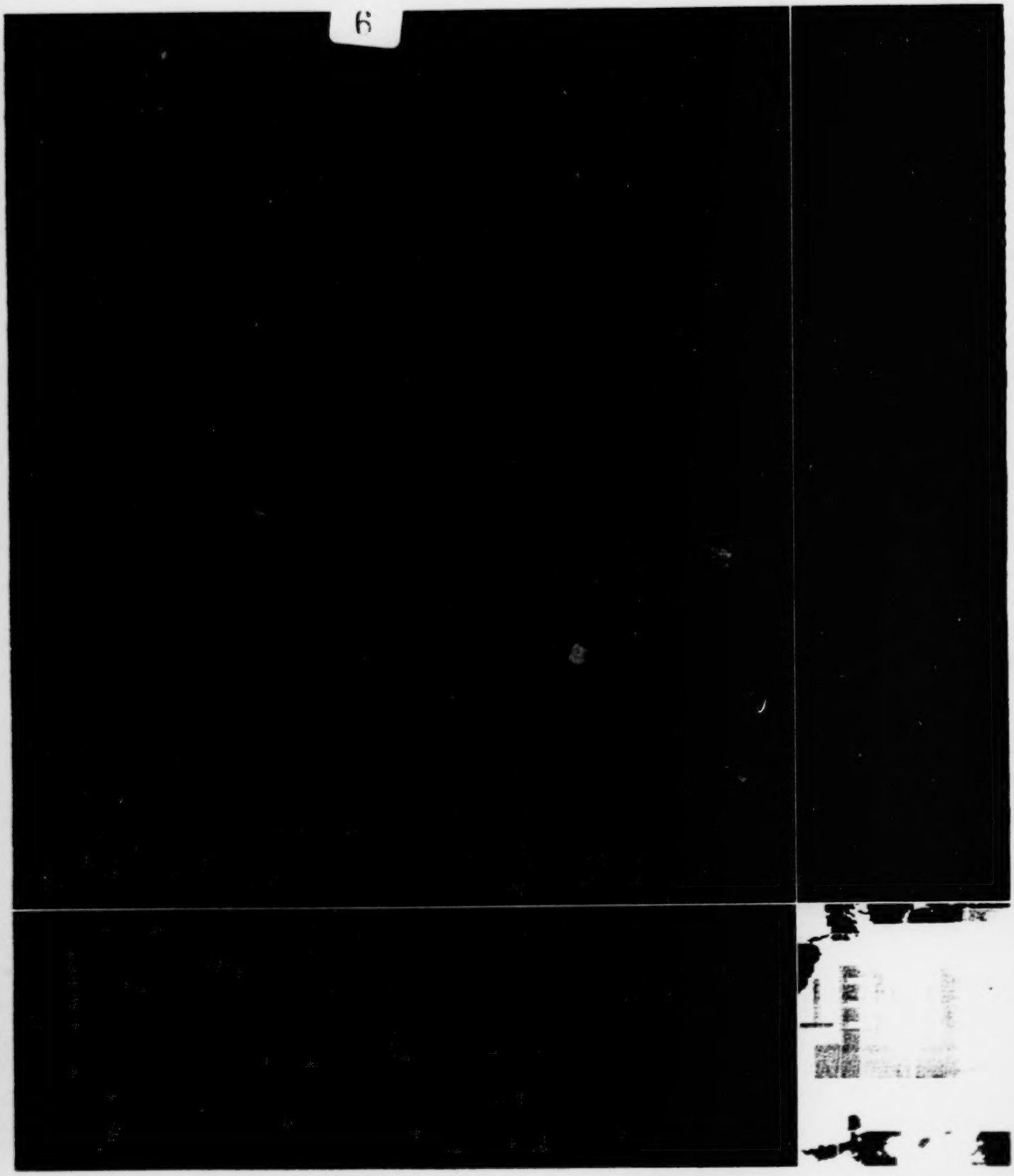


Review of the issue

This Dossier raises three main questions.

- What are the consequences of changes in training systems on the profiles of trainers?
- How can we predict the changes that are going to affect training occupations?
- How can we organise the transfer of innovations likely to produce Community added value, i.e. greater knowledge and collective progress?

Those questions are tackled by considering the situation in two countries:

- the training system in Portugal;
- the forward studies contract on training occupations in France.

1

Development trends in the vocational training system – the situation in Portugal

1.1 Background

The issue of the training of teachers and trainers must be viewed in the context of vocational training in Portugal, which is characterised by the division between the Ministry of Education and the Ministry of Employment and Solidarity. The legal framework is also described by Portuguese experts as 'dichotomous', owing to the remits being shared between the Ministry of Education (responsible for the vocational training of young people by traditional education or through apprenticeship) and the Ministry of Employment (responsible for training the working population and the unemployed).

According to Portuguese experts, however, an attempt is being made to rebalance the educational system towards more professionally oriented studies by setting up regional vocational schools at local level, geared to local needs, and the development of new vocational courses of study in higher education.

The training of teachers and trainers is the result of the existing separation between the two systems: the training of teachers remains geared to statute, while the training of trainers is geared more towards the market. To be recognised as a trainer under Portuguese law, you have to have a training qualification awarded on completion of a 90-hour training course.

1.2 Changes to be considered and their impact on the profiles of trainers

Current changes in the organisation of labour should lead to the traditional division between initial training and continuing training being rethought. According to E. Fonseca, 'only integrated education, training and employment policies are likely to produce qualifications'. Only an active partnership between the world of education and the world of employment on common ground is able to build new professionalisation schemes. For Portuguese experts, the keyword is 'contextualised continuing training' in the sense of a spatiotemporal continuum, i.e. training integrated both into individual career paths and organisational schemes.

The professionalisation of those involved in training must therefore be rethought in terms of the 'search for a new training paradigm' with a three-fold approach:

- moving from school-based training to subject- and job-based training;
- changing over to training devised in terms of individual career paths;
- managing training as a strategy that is more greatly integrated into organisations' schemes.

1.3 The development factors of the training function

Various factors affect the profiles of trainers. These include the change in the nature of work which, as it becomes increasingly abstract, requires greater skills in terms of information management, feedback and anticipation, and refocusing on individual ability as a factor of internal and external mobility. These factors directly influence the 'qualities required of the trainer', as well as the organisation of training activities, with three major results:

- greater teaching, relational and managerial skills;
- restructuring of activities around emerging profiles or functions: tutor, adviser, as well as the support function and the function of intercepting and mediating between the systems;
- the possible development of training technologies and simple training media as an instrument for developing new partnerships in teaching.

1.4 Issues to be dealt with within a Community dimension

Two aspects of the issue of the professionalisation of trainers must be dealt with from a Community viewpoint, given their current importance in Member States.

- Greater environmental demands and the sophistication of training systems are leading to a diversification in the names of the training functions, together with the need for validation/certification, in the majority of the Member States. What approach should be followed: the internal approach based on individual competence, or the external approach based on the analysis of functions? Examination by a working party of the approaches taken up by various Member States, and their underlying choices, could help create more transparency.
- Speeding up changes which affect employment systems also requires a vigilant and research-action attitude, particularly for observing the impact of these changes on the activities and role of the trainer.

2

The future of training occupations – the situation in France

The submission of the CEP (contrat d'etudes et prospective – forward studies contract) results on training occupations in France was a great help in understanding the changes likely to affect the training subsystem.[1]

The approach adopted for carrying out the CEP is forward-looking. It relies on facts arising from a forward analysis and on the variables of change in training, updated with a series of forward studies, for deducing the challenges which the training function will have to meet, and the foreseeable changes in activities.

The attempt to forecast the future also involves specifying the environment in which training occupations in France and in Europe are changing. This is characterised by:

- points of no return such as the globalisation of the economy, the boost in connectivity, linked to the development of IT networks, and the exponential growth in learning;
- major uncertainties about the spread of new technologies, transformations in the work-employment relationship, and the change in lifestyles associated with greater leisure time.

According to the authors of the CEP, uncertainties about the rate and extent of social changes are such that we can only reflect on the development of vocational training with the help of scenarios. Four scenarios for training were therefore proposed.

- Based on the hypothesis of an economic slowdown in our countries, the first scenario could be entitled educational decline characterised by a complete tightening-up of training around the economic criterion: employment will become casualised, the teaching processes pauperised and two-speed training will be set up.
- In a second scenario, emphasising the current situation in our countries, 'hyper-competition', will lead to an 'educational elitism' of cut-throat commercial practices and competition between public, private, consular and Community Organisations.
- In a deregulated world, if countries succeed in

1 The survey was carried out in 1995 at the request of the Ministry of Employment and Solidarity (government delegation for employment and vocational training). It concerns training occupations relating to the sector of private training institutions. It was published in *Documentation Française* (1998). We include here information from a contribution to the Faro seminar by P. Carré.

reconciling the economic imperative with social cohesion, a third scenario, the 'contractual training' scenario, could then emerge. Here, productive teaching mechanisms and new categories of applicants will enable organisations to develop socially and economically at global level through the multiplication of innovative practices and the development of partnership arrangements between clients and suppliers.

- Finally, the fourth scenario will be the 'learning society', which will see the humanist order of social and economic development triumph through and for knowledge.

2.1 Variables of change in training

Whatever the dominant scenario, the change in occupations will have to be governed by five main variables.

The first variable concerns the optimisation of the quality-cost ratio. This means that the quality-cost parameters are jointly controlled by introducing the concept of educational productivity. This development is also the result of a refocusing on the problems of evaluation in training considered in a more instrumental function.

The second variable concerns the training-employment relationship which is characterised by a tendency to dilute the training within the job and within the organisation, hence the emergence of new functions (tutorial system, coaching) and the integration of the training function into the vocational functions.

The third variable covers the opening of training mechanisms. This concept, which relates back to the multiplicity of locations of training sites and methods (databanks, exchange networks and resource centres), causes a break-up in the training process's unity of place, action and time. This is how the upheavals affecting the image of the trainer in his relationship with knowledge and with his audience are measured. This variable contains the risks of a real 'identity crisis'.

The fourth variable concerns 'the rise to prominence of the individual within the training'. The measures for funding the training (training voucher, time-capital, etc.), the upstream and downstream development of training, subject support measures (guidance, appraisal of skills, project monitoring), are the result of this trend. On this point again, it is new skills which are in demand outside the trainer's traditional function.

Training target-groups must also be taken into account

as a variable. In the case of the French system, three main sectors can be seen: the private business market, the public market, the very small businesses and the professions, which make up a very fragmentary, but growing, sector.

2.2 Effects on training occupations

According to the CEP results, all these changes will profoundly alter the job of trainer to the point where we shall no longer be able to think in terms of jobs, but in terms of activities of variable geometry, which re-form according to situations within professional groups.

The CEP therefore intends to break with the traditional approach to training occupations or conventional jobs, which are scarcely compatible with the versatility of work activities, in order to put the analysis of activities back into the context of four professional groups:

- organisation of mechanisms and training periods;
- training engineering, educational engineering;
- marketing, commercial;
- management.

The exercise which tends to place the analysis of the changes in training occupations within a forward-looking context entails, however, risks.

To derive the role of training systems from the change in the socioeconomic order is to make them dependent on a market order. Is it not possible to envisage a proactive role for training which carries cultural references, notably in the European context? 'Building a European framework for the training of trainers would involve fitting it into a project where social cohesion prevails over the economic imperative' (T. Ambrosio).

At the same time, predicting the future, as reading trends, must be kept as a beneficial exercise, allowing the provision of training for trainers to be regulated more effectively in the future, this training having so far developed with no real anticipation or control.

If its results are taken on board by those professionally involved, predicting the future will become an instrument for steering the development of the profession.

While the training function at the present stage will certainly change profoundly, it is impossible to determine precisely the nature of these changes. In order to move on from the hypothetical stage, therefore, a tool and an approach should be created. Could the observation of innovative experiences in the field of training help us do this?

The role of innovation

The findings of the study on innovation criteria conducted in connection with the establishment of a European innovation observatory were presented and discussed at the Faro seminar[2]. On the basis of work done on company sociology, the study shows that, by analogy with the approaches of industrial innovation, it is possible to attempt an operational definition of innovation as a finalised process leading to a result in a given environment. This is a process marked by the role of the players, who are often different in the initiation, management and dissemination of innovation.

The analogy proposed in the study between innovation and training and innovation in productive organisations is promising on two accounts.

- In the search for criteria which make it possible to describe, analyse and look for the transferable elements of innovation, it moves the observer away from the centre of the result of innovation towards the process of innovation itself.
- It also puts forward a link between innovation as a process and training as a targeted, organised, controlled process, leading to a result which meets a demand. This link can facilitate joint analysis of the two processes.

Discussion confirms that the dimensions which are inherent in the innovation process itself, the involvement of the players and the management of temporality, play a crucial role.

In this regard, mention should be made of the case of the educational methodology course developed by the INEM (Institut national de l'Emploi – National Institute of Employment) on interactive CD-ROM. Launched by INEM, it was several years before the project became a reality owing to resistance from trainers. This example shows that innovation is not carried through because trainers not actively involved in the change reject it.

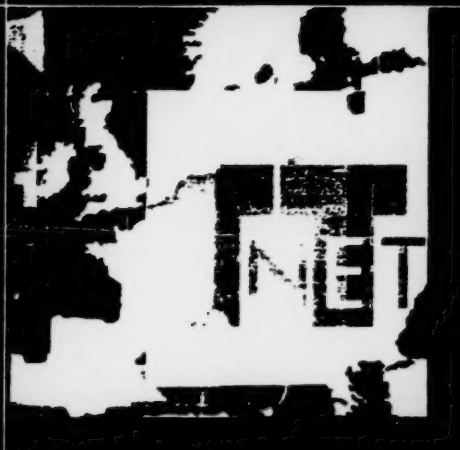
The innovation process is itself shot through with the players' own ideas: innovation is often carried out by marginal players who find in it a cause for legitimacy.

The 'time' dimension is present at several levels of the innovation process: innovation cannot be imposed, because the 'right' moment must be seized – before is too early and afterwards too late.

Furthermore, time is short. To use innovative

2 Blignières-Légeraud, A. de. *Criteria and parameters for the identification of innovation in the field of the new technologies applied to education and learning*. Cedefop, 1998.

experiences as a lead for observing changes affecting training means taking the time for analysis. Since innovation is determined by the product, trainers do not have time for analysis: as soon as the product is on the market, they have to move on to something else. In conclusion, the operational definition of the innovation proposed nevertheless constitutes a problematic framework to be completed and enriched by the joint analysis of innovative experiences located in different contexts. Such a procedure could lead to the joint Community drafting of updated parameters of the training function along the lines of a problem worked out together.



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Contributions

1. Training of trainers in a changing socioeconomic context

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2. New media and changes in the professional role of the trainer

Pol DEBATY

3. Criteria and parameters for the identification of innovation in the field of new technologies applied to education and learning

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1

Training of trainers in a changing socioeconomic context

Eduardo Augusto PERES FONSECA
IEFP – Institute of Employment and Vocational Training

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Introduction

As we approach the end of this century, the existence of qualified human resources – in any society – constitutes a deciding strategic factor in the process of that society's development and its economic and social programmes.

It is a society's human capital which governs the speed at which it can adapt, its ability to maintain satisfactory productivity levels and which, in the final analysis, determines its strategic value and the effectiveness of its leaders and decision-makers.

There is a need to develop and enhance the quality of training, with investment in people and their abilities, to pave the way for subsequent action.

The economic and social changes brought about by globalisation, its accompanying delocalisation and strong scientific and technological impact have shifted the focus onto personal fulfilment and a striving for knowledge, versatility, multiple talents and the ability to adapt again and again.

From among the countless and complex changes three features emerge which characterise the contemporary age as we approach the next century:

- markets which are both globalised and segmented, but always dynamic;
- accelerating revolutionary change in science and technology;
- the promotion of the information society.

The factors which differentiate countries, regions, organisations, schools and universities in this information society are:

- the tangible and intangible infrastructures available to them;
- the quality of their trainers;
- the integrated management of their working hours;
- their operational capacity to sustain lifelong training.

The objectives which are essential to the modernisation process can only be attained if the appropriate technological infrastructure is in place to support the restructuring of traditional industries (basic technologies); this intensifies the level of technology in production through the creation of new products based on new technologies (key technologies) and brings improvements to training, productivity and quality.

There is a need to invest in innovation and in the development of the technological base (renewal technologies) without causing so-called traditional industries to be abandoned. The opportunities for innovation in these areas will enable new models of quality and design and more sophisticated production processes to emerge. This will in turn make it possible to make best use of comparative dynamic advantages and diversify productive structures, the underlying principle being to add value of a permanent nature to the workforce.

Consequently, in the areas undergoing the most radical change, the focus in education and training will tend to shift towards lifelong learning, in contrast to the traditional practice of obtaining certificates which provide evidence of initial training.

Training methods and concepts are also changing radically with regard to knowledge and technology themselves: witness, for example, lifelong training, continuing training and 'just-in-time' learning by means of telematic tools and multimedia.

The efficient use of knowledge counts for more than the volume of knowledge acquired. The individual is moving away from study in isolation towards participation in an interactive network with personalised learning.

What gives value to vocational training is, in the first place, the quality of its trainers and researchers, a fundamental element if high-quality training and excellent training methods are to be developed.

2

Eduardo Augusto PERES FONSECA

The required profile(s) of the trainer(s)

A consideration of the skills of the trainer to be developed generates an extensive profile, which must include:

- technical proficiency, with technical and technological mastery of the vocational skills being taught and learnt;
- pedagogic skills, with the ability to pass on technical and technological knowledge.

It will be necessary to develop a form of hands-on training aimed at promoting discovery-oriented education and self-training;

- social skills, based on an analysis and understanding of social factors. A training which leads to a new attitude towards others, towards new social issues and, above all, towards innovation and change;
- corporate skills, aimed at managing technological change, in particular where this concerns the working environment and corporate life.

This profile should also take into account the knowledge and mastery of technical language (knowledge), skills and mastery of tools (application of knowledge), the attitudes relating to savoir-faire which make it possible to 'act', which 'empower' and thus permit communication, the constant updating of 'the know-how of learning', and which help to create and transform 'applied knowledge'.

The emphasis is currently on learning rather than training.

Learning is above all the result of activities undertaken by individuals, while training is merely a means to an end, which is learning.

The traditional model of training is characterised by the immutability of training syllabuses which remain valid for a number of years.

The paradigm of learning in the technological age is a paradigm of self-education.

The new technological culture brings into play new ways of thinking, communicating, and behaving which individuals will have to assimilate if they are rise to the new challenges of productivity and competitiveness.

Individuals who consciously invest in their training and assume a greater responsibility for their learning are clearly at an advantage in a constantly changing environment.

They have the confidence to solve problems which earlier they would have side-stepped, they experience fewer obstacles and will be capable of transferring knowledge from one situation to another; they are therefore more flexible.

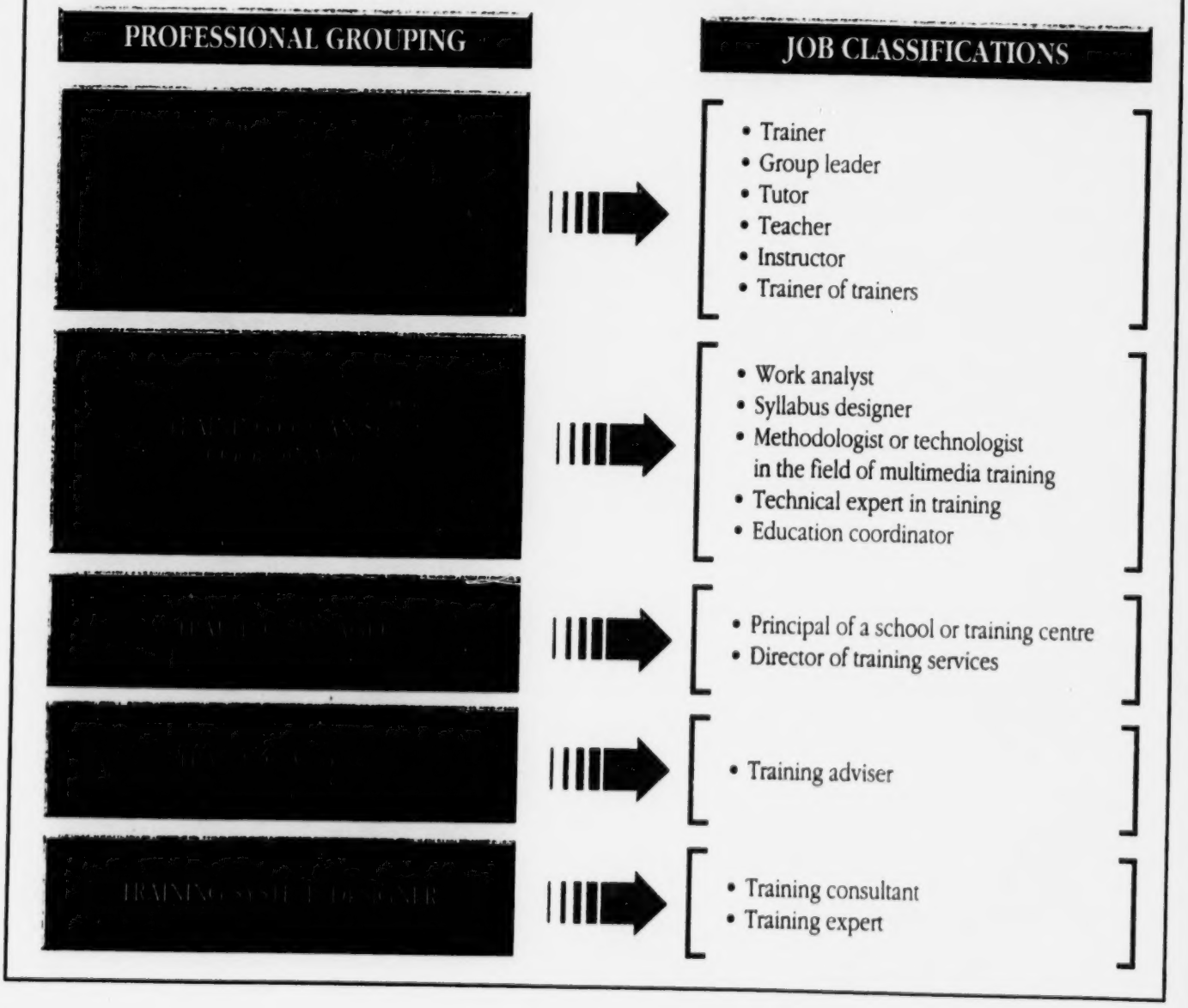
3

The professional 'family' of trainers – certification

A great variety of job classifications exist in technical literature and in the various training systems.
We should not lose sight of the fact that what we propose is nothing more than an attempt to approach this complex and delicate subject under discussion within the various competent bodies, namely those responsible for the occupational certification of trainers.
It is clear that the establishment of training profiles specialising in the various aspects of the training system is slow and inadequate. At the same time, difficulties in developing a system for the certification of specific and 'exclusive' skills in the field of training are becoming apparent.
One of the questions which arises is whether trainers who develop their professional activity within specific and distinct subsystems of education and training must have training and skills which are equally specific and distinct and whether, as a result, we should take steps to recognise their activities as professions within these subsystems. The risk here is that it would encourage the creation of different professional bodies of trainers according to the subsystems in which they are active.

One of the problems which arises in this respect is how to ensure some degree of standardisation of the processes for accreditation and certification currently used in the various countries of the European Union, to facilitate the recognition of qualifications held by trainers.

THE 'FAMILY' OF TRAINING PROFESSIONS



4

The training of trainers – new skills

The training of trainers offered by different organisations is an education-based training, which focuses on 'menus' of courses which are primarily attendance courses, given in a classroom away from the work environment of the organisations themselves and enterprises.

The approach in initial and continuing training of trainers is thus dominated by attendance at courses with formally recognised syllabuses which are essential for certification.

'The trainers of today reproduce the education models passed down to them by their own trainers and so on ...'[3].

Although this statement appears paradoxical to us, it is perhaps a reflection of reality – our reality.

When we enter the 21st century, training cannot continue to be governed by learning models which have developed much faster than the changes witnessed in the education and training processes.

Technologies have developed to such an extent that it is no longer possible to ignore them in the common processes of education and training. Not only because technologies have become so firmly rooted in our everyday lives, but also because other needs of a sociological nature are becoming more and more pressing. To be more specific, we are referring to the rapid obsolescence of a substantial part of professional knowledge and the consequent need to bring it up to date, sometimes with requalification or even a career change.

With the constant evolution of occupational profiles, a process which is linked to a high degree of corporate competitiveness, it is not a simple task to maintain the workforce with high levels of productivity.

One of the solutions put forward most emphatically has been that of distance learning. For various reasons, this training strategy has not gained the weight or importance that had been predicted for it some time ago. None the less, new communication and information technologies have contributed quite substantially towards the definitive establishment of distance-learning models.

Against this background we must consider that there at least two aspects on which the training of trainers will necessarily have to focus:

- that of **attendance training**, requiring the systematic use of 'information society' tools, from

3 Negroponte, Nicholas, *L'homme numérique* (Digital being), Pocket, Paris, 1997.

videos to multimedia, through the use of telematic networks;

- that of **distance learning**, employing new learning media and techniques, namely telematic networks and interactive learning materials (on-line and off-line multimedia products), with the creation of virtual learning areas (such as virtual centres or virtual libraries, using Internet protocols).

In either of these situations, the trainer must have the following:

- a thorough knowledge of the use of different media in education and training processes;
- an awareness of the learning styles of those undergoing training and how they interrelate with the stimuli of information received via these media;
- a knowledge of techniques for designing and producing educational materials on different media.

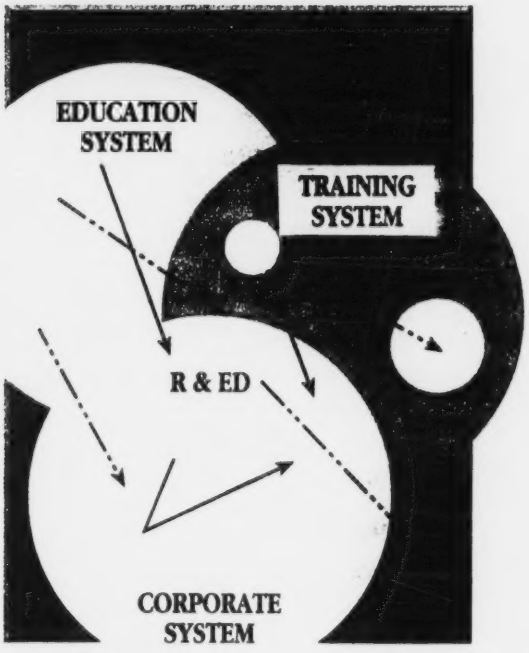
In the particular case of distance training, in addition to the above qualities, the trainer must:

- have specific competence in the field of distance learning methodologies;
- have a mastery of tutorial methods and techniques for advising trainees who are studying alone;
- have the ability to manage virtual learning areas, in particular to bring different services into play with the use of Internet protocols (New, IRC, e-mail, etc.);
- develop methods of research and investigation and promote the discussion and exchange of experiences relating to innovation in the fields of training, organisational models and the management of people.

The organisations offering learning facilities are also being forced to adapt and be in a position to provide knowledge according to the 'just-in-time' concept. Large training departments will have to be gradually replaced with networks linking learning units, with the syllabuses set according to personalised training programmes at the expense of modular training methods. Telematics, multimedia and information technologies in general are the most influential vectors in this evolutionary process.

5

Research and experimental development – R & ED



The concept R & ED includes three activities:

- fundamental research,
- applied research,
- experimental development.

The institutes of higher education concentrate on fundamental research with the aim of promoting the advancement of knowledge (especially in the areas of social and humanitarian sciences and the exact sciences) as well as productivity and technology (putting a large part of their resources into engineering and technology).

Industry, for its part, tends essentially to invest in experimental development, which generates economic returns in the short term.

This difference, while a potential source of synergy, in practice constitutes one of the points of disagreement between the two sectors just at a time when cooperation is needed.

Here the vocational training system can play an important role in bringing the education system and the corporate sector together, once the system itself has the means to develop or support experimental research, whether in cooperation with universities, skills centres or enterprises. There is a need to develop a system for working together in a network.

In fact the institutes of higher education could, as generators of knowledge, transfer part of their stock of knowledge to enterprises, via appropriate channels.

Turning to the corporate sector, the interaction of the latter with institutes of higher education and vocational training could help it to improve its own capacity for innovation and thus improve its competitiveness.

5.1 Innovation and experiment in the training of trainers

Dialogue and cooperation between those most responsible or involved in action in the field of training and researchers from various fields of knowledge will be able to guarantee and reinforce a proactive spirit of innovation and experimentation.
By experimentation it will thus be possible to invest systematically in technological and educational innovation, improving the content of courses, practices, organisation and the training of trainers.
Investment in research and the development of new technologies for training will enable the following objectives to be achieved.

- **Technical training** (for technical trainers in the areas of office technology, information technology, robotics, home systems, CNC, CAD/CAM, electronics, etc., covered by the vocational training centres, while giving the trainers contact with equipment similar to that used in the respective centres).

  The existence of laboratories which are technologically well equipped and even in some cases technologically ahead of their sector is essential for the good technical and scientific training of trainers. Training beyond training in the so-called basic technologies must also promote the blossoming of renewal technologies, but this would require the training of people in advance and their subsequent placement with enterprises.

- **Pedagogic-didactic training**
  The specific objectives are as follows:
  - to improve pedagogic capacities by using new technologies for meetings simulations;
  - to analyse new forms of training and new syllabuses which account for the effects of new production systems on the organisation of work and on vocational qualification;
  - to enhance the capacities of trainees in the structuring of training activities, in order to stimulate, evaluate, orientate, organise, structure, direct and design training activities in line with a changing reality imposed by new technologies.

- **Raising awareness in the use of information technology in training**
  This covers a number of specific objectives as follows:
  - to help to raise the awareness of trainers to new technologies and their practical application;

- to develop techniques for writing computer-assisted training programmes in technical areas;
- to conduct studies in the fields of new training technologies;
- to test educational methodologies which correspond to training needs generated by new technologies in manufacturing and services;
- to produce educational software and teach trainers how to produce and use new technological tools in their work;
- to hold awareness-raising events and demonstrations to show the educational application of new technologies and to allow participants to try out the various materials;
- to collect literature on the various fields of new training technologies.

- **Research and development of new technologies** (modular and flexible training, distance learning, computer-assisted training) and their subsequent testing at a centre.

5.2 Use of new technologies by training services – multimedia technology

Learning and working methods are in a state of flux. Information and telecommunications technologies are fomenting this change and forcing human resource management departments to change their behaviour, attitudes and thinking in carrying out their activities. Telecommunications have developed to such an extent that not only have many traditional concepts and techniques become obsolete, but new forms of equipment and services are being introduced which encourage training.

The use of new technologies in training, self-training, distance learning, computer-assisted training and the computerised management of training, with appropriate content, encourages self-education, optimises resources, promotes equal opportunities, reduces distances and enables people to study different subjects at different speeds.

Mastery of technological change, in particular the integration of new added value services such as data, voice, text or imaging, has become absolutely essential for the workforce of the 21st century.

Looking in particular at educational, training and work activities, three fundamental services which provide

access to information and communications should be highlighted:

- Internet,
- electronic mail,
- teleworking.

The services offered by the Internet have become a preferred means of support and research among students and teachers.

The widespread use of multimedia and telematics-related services are tracing the development of the information society and intensive knowledge.

Interactive television looks set to revolutionise the market for video on demand. Video games, simulation and virtual reality are penetrating various sectors of activity. New methods for the production, transport and distribution of information have been placed at the disposal of users.

The 'information superhighways' are becoming a reality, and today represent a substantial level of investment both in their infrastructure and in telematic products and services, integrating sound, voice and images in a single concept. This development radically alters the relationship between mankind, time and space.

The European Union is making a considerable effort to find a position in the 'multimedia' battle in the following different areas:

- teleworking,
- distance learning,
- university research networks,
- telematic services for SMEs.

Broadly speaking, we can identify two distinct areas of training:

- technologies for the design and production of multimedia materials;
- information management systems technologies.

The first includes knowledge related to product design in advanced computer languages, using models of interactivity and design in the fields of collection and processing of sound and images, whatever their origin. CD-ROM, DVI (digital video interactive), CDI (compact disc interactive) and wide-band communication networks are typical final media for the above products. The following are typical functions of this area:

- programming in advanced languages;
- use of CAD programmes and 2D and 3D animation;
- use of image-processing programmes;
- collection and processing of video images and sound to prepare them for incorporation into multimedia;

- integration of multimedia materials in appropriate media.

The second of these applies knowledge related to the design and installation of information flow support networks, the organisation of information management systems and the collection and processing of information itself.

Typical media in this field are the various types of network based on different servers, the design and maintenance of BBS (bulletin board systems), and the use of the Internet for the collection and processing of information.

The following are typical functions:

- e-mail service,
- computer conferences,
- use of the Internet,
- video-conferencing,
- information management.

The training of trainers in the fields of new multimedia production technologies and information technologies will have to be undertaken as a major European project. An attempt will be made, through appropriate training models, to adapt these two fields so that they might exist side by side and to develop techniques which recognise this integration and its flow on what we have come to call the 'information superhighways'.

It is often thought that we profit more as a one-man band, but it is unusual to have the many skills necessary to create a really good educational 'site'. Generally speaking it is necessary to have a team of at least four people:

- a contents specialist, or teacher/trainer (and sometimes researcher) whose main tasks would be to:
  - identify objectives;
  - design the educational content, learning activities and methods of appraisal;
  - define the framework.
- a specialist in educational applications of information and communications technologies, to help the person responsible in this area to:
  - identify objectives;
  - structure the content;
  - draw up the educational design and graphics for the educational 'site';
  - design learning activities, interactive materials and appraisal tools;
  - design the organisation chart;
  - manage the project;
  - evaluate and install the educational 'site', etc.
- a multimedia team to create good quality material suitable for sites (introducing text, images, sound, video, animation).

- a computer specialist to programme the page frames, interactive activities, etc.

Looking to the future, we have identified the following areas of action in the training of trainers and other technical experts in communication and multimedia technologies:

- training of trainers in:
  - multimedia materials design and production,
  - design of distance-learning projects,
  - audio and video design and production,
  - graphic design for video and multimedia products,
  - design and operation of information systems;
- training of technical experts for the multimedia industry in the above areas;
- training of audiovisual technicians;
- the training of other technical experts, necessary for the development of distance learning, in collaboration with universities, skills centres and enterprises, with a view to training the following in particular:
  - scriptwriters,
  - programmers,
  - producers,
  - directors,
  - technologists.

Still on the subject of trainers and teachers, training in the new technologies of information and communication means, primarily, training in use, office technology applications and navigation on the Internet, but especially training in the pedagogical aspects of the application of technologies.

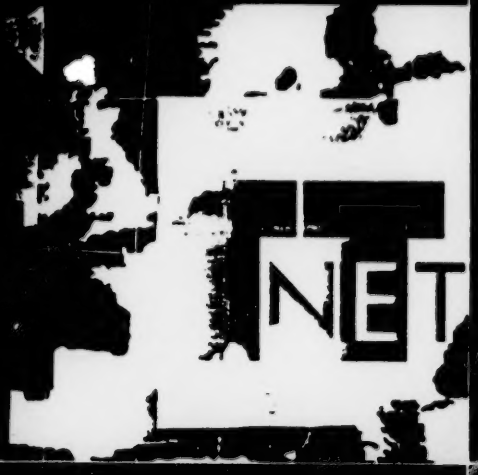
In addition to the questions which have already been posed, here are a few others which should also be discussed:

- What trainers will be needed for the 21st century?
  - a distance-learning tutor-trainer?
  - a multimedia designer?
  - a network instructor?
  - an Internet user?
  - a resource centre administrator?
  - a trainer/consultant to promote local and regional development, aimed at SMEs?
- How do we make the definitive transition from new technologies of information and communication to new educational technologies?
- How can multimedia influence the development of educational techniques by spawning innovative educational ideas?
  - personalised educational workshop;
  - modular training arrangements:
    (a) independent study,
    (b) differentiated education,
    (c) personalised training programme;
    (d) personalised training credits.

- What practical and methodological problems arise in the use of the Internet at school and as a training tool?
- How can the European Union's fifth framework programme for research and development (1999-2004) be used to promote the development of the market for distance learning and multimedia products and services, supporting related projects, integrating educational research, technological innovation, experimentation and validation on a large scale.

How can we take advantage of the initiatives of the new task force on multimedia educational software to develop the European dimension of the training of trainers?

Erroneously, most changes undertaken prepare for the 'future of yesterday' instead of bringing the 'tomorrow of today'



New media and changes in the professional role of the trainer

Pol DEBATY

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1

Context and subject of the study

1.1 Scope of the study

Cedefop describes this study as a working tool for the evaluation and critical analysis of the documentation currently available in the Member States both in the form of studies and research and in relation to experimental initiatives concerning the relationship between new educational media and changes to the training of trainer's systems, the content of the training and to the trainers' professional role.

The aim of the study, which is confined to questions facing teachers and trainers involved in initial and continuing vocational training, is to look at ideas and practices in the field of the development of training of trainer's systems, highlighting innovations and marking out ways forward towards more in-depth studies and research.

These ways forward will be discussed in the final section.

The other sections will set out a number of hypotheses relating to the development of the roles of trainers in vocational training and to the innovations in their

training systems following the huge advances in NICTs (new information and communication technologies). This is neither a list nor a catalogue of the works (articles, printed works or works disseminated via the Internet) produced by vocational training institutions, training bodies, specialist adult training establishments open to all, the appropriate international organisations – such as Unesco or the ILO[4] – or even the European Union directorates-general involved in these areas (DG XXII Education; DG XIII New Technologies, DG III Industry; DG X Information[5]) that have created interfaces between education, technology and economics.

The reasons for this are simple: the proliferation of works on the use of new media in every field, the increasing involvement of new media in the field of education and training, but also the great scarcity of works relating specifically to the roles of the trainers. We have therefore sought out, in the various Member States and their documentation centres, the publications of recent years that most clearly reflect the new approach to the teaching relationship in vocational training and learning systems, in which the media are playing an ever greater training role and have a degree of autonomy based on their systems of operation.

1.2 Historical notes

The traditional medium of the educational message was and to a large extent remains the spoken word, followed in the course of time by the written word that fixes the content and allows it to be reread, in part in the case of personal notes, in full in the case of a textbook. The textbook was the teacher's first teaching aid, reproducing not only the content of the educational message but also the teacher's way of presenting and illustrating it.

So it is hardly surprising that the new techniques for printing courses of study which appeared as soon as schooling became compulsory were widely used by teachers who preferred 'their' courses to the textbooks of a rival author.

The use of printed works at school, and of other teaching aids (various materials, projection of images), did not substantially change the role of the teacher; it was he or she who prepared and taught the lesson.

4 International Labour Office.

5 The names of the Directorates General of the European Commission have changed following the current restructuring of the Commission services. For more information consult: http://europa.eu.int/.

1.3 Post-war innovations

Most of the armies deployed in the Second World War found themselves forced to train their soldiers to use increasingly sophisticated military techniques. This accelerated training was entrusted to officers with little experience of teaching techniques. That meant they had to improvise as supervisors, instructors or trainers in an area where until then there had only been primary and secondary school teachers and university lecturers.

The methods developed by the military training centres were deliberately different from the working methods used in schools or even in military academies. The officers' job was quickly to teach each individual what he needed to know for combat purposes. Naturally enough, this concept of need raised questions about the objectives of the training. What did the men need to know? What did they need to know how to do? What made a good soldier?

They looked at the experimental teaching methods that had been developed and which had until then mainly been applied only in the laboratory (effective conditioning, linear programming, measurement of attitudes, etc.), as a means of achieving rapid and effective results.

At the end of the war, the soldiers returned to their homes and to the labour market. During this new readjustment, they made the most of what they had learned in the military training centres. Most of the countries that had taken part in the war set up accelerated vocational training centres (AVTs), while the demobilised teachers at every level were happy to find themselves back in the traditional surroundings of schools scarcely affected by the changes. The innovations were to be found in firms seeking qualified staff capable of using the techniques and methods developed during the war. And it was also at this level that the first trainers were to be found and the beginnings of what became seen as the mismatch between the education system and the characteristics of the labour market (the new skills).

1.4 Documentation

Until 1970, the teaching world was interested in the use of radio, and then of television, largely as a means of illustrating the teacher's message. In vocational training in particular, television made it possible to demonstrate a point in the classroom, to focus the learner's attention on an important point, in fact to simulate a

phenomenon difficult to observe or renew, although 'lecturing' remained the basic form of teaching relationship.

This may seem a little paradoxical at a time when improved techniques for producing images (colour, superimposition, animation) and conveying these images (cable, satellite) were flourishing and could have encouraged the spread of distance learning and self-study. But, on the contrary, the introduction of compulsory lower secondary-school education for young people, with, as a result, the increase in the numbers of students at a higher level, led to a parallel increase in the number of teachers and trainers in adult training establishments responsible for 'correcting' the dysfunctional aspects of the earlier ones.

The documents published at that time refer to the attitude of certain sectors of the public to television (in the USA, the slogan was 'People watch television'). The research departments of both French (ORTF-RTBF) and English (BBC) television conducted quality pre-testings of TV broadcasts with a view to improving their ratings among certain sectors of the public. This was in fact the start of the market surveys of commercial television series that now play such an important role in various fields, including education and training.

The use of television in schools (or universities) tried to establish a dialogue between the learner and the trainer by using what were already by then the old techniques of correspondence courses (based on accompanying courses of study and 'homework'). This was mainly a way of measuring the size of the population groups concerned (viewing figures) and the educational results (interim and final written tests).

The use of the video recorder, in the presence of tutors, introduced a third player into the teaching relationship. The tutor was the organiser of the training and not necessarily an expert in the subject taught but more an organiser of the group being trained.

From that moment on, more and more players became involved in training. Obviously they included traditional teachers, but also and perhaps above all they included what B. Blandin[6] calls the 'mediatisers', who give form to the educational messages and then make them available to teachers for their use or, more directly, to learners engaged in self-study.

Between 1970 and 1990, the published documentation was summarised in the 13 volumes and 4 000 odd pages of 'The Training Technology Programme' (1987)

6 Blandin, B., *Formateurs et formation multimédia*, Les éd. d'Organisation, Paris, 1990, 240 pp.

published under the editorship of B. Wilson[7]. The various titles reflect the areas of expertise of the writers involved and the developments in the technological methods applied:

Vol. 1: Training course methodology
Vol. 2: Methods of training: group work
Vol. 3: Methods of training: individualisation
Vol. 4: Methods of training: self-study, new skills
Vol. 5: The psychology of the learner during training
Vol. 6: Evaluation of training
Vol. 7: The organisation and management of training
Vol. 8: Graphs and representations in training
Vol. 9: 'Audio' techniques in training
Vol. 10: The projection of images in training
Vol. 11: Using videos in training
Vol. 12: Computer-assisted training
Vol. 13: The interactive video in training.

B. Blandin quotes the same works in a bibliography of more than 200 titles, which he welcomes as an example of capitalising on the teaching media developed by various individuals and made available for use, adaptation or copying.

We are not proposing to embark on a critical analysis of this 'sum' of works, which could be added to every time a new technology is applied in the field of training.

This is in effect what has been happening since 1990, since when it has become increasingly easy to show text, fixed or animated images and even the picture of the distance-learning teacher on the same screen. It is indeed the multimedia era.

Le grand livre du multimédia by H. Frater and D. Paulissen[8] was published in German in 1993 and translated into French in Paris. It is aimed at producers rather than just users. On a note of humour, it dates the appearance of the multimedia back to the year 1500 BC, when 'Moses presented the 10 commandments and combined the inscribed stone tables with the voice of the Lord, thunder and lightning'. More seriously, we can adopt their definition of the multimedia as 'the integration of text, graphics, sound, animation and video images for information purposes' in an interactive situation. The word is spoken. The learner is central to the teaching relationship. He can adapt the message, adjust it to his way of understanding, his limits, his interests, and

7 Wilson, B. et al., *The Training Technology Programme*, 13 volumes, North West Consortium, 1987.

8 Frater, H. & Paulissen, D., *Le grand livre du multimédia*, Data Beeker, Dusseldorf, 1993, 580 pp.

if necessary supplement it with other means (such as appealing to the tutor!).

But the difference between B. Wilson's book and *Le grand livre du multimédia* is to be found mainly at the level of the protagonists. In the first case they are trainers who discover in the information technologies a means of making their educational messages more effective. In the second, they are 'all sorts of people', including trainers, who are struck by the innovations offered by telecommunications techniques and networks and endeavour to insert their messages, some of them educational, in this increasingly virtual world. Could this spell the end of the teacher?

1.5 Teachers, trainers

In a university summer school held in July 1998 which brought together trainers of all kinds to discuss the new skills of the teacher (the pedagogue, or andragogue or anthropogogue), a round table of experts representing the main training organisations or institutions gave each participant a chance to react in his or her own way to the new jobs involved in training. This produced a series of pleas in defence of conservativism, reflected in numerous articles and publications[9] published by public or professional teachers' bodies. Are the traditional teachers 'by trade' at risk from the advent of information and communication techniques in schools and firms? Or, on the other hand, is it enough (as was the case in France and as is happening with the current project in French-speaking Belgium) to install tens of thousands of interactive PCs in schools to improve quality and reduce failure? The issue is not that simple, but this defence of the status quo will not prevent fundamental changes to the roles played by the trainers and their skills.

1.6 The trainer's new skills

There are some basic differences between the use of educational tools and their design. The trainers' talents are not evenly spread. This became particularly evident

9 Including:

Annoot, E., *Les formateurs face aux nouvelles technologies: le sens du changement*, Ohrys, Paris, 1996, 199 pp.

Brabandère, L. de, *Le management des idées. De la créativité à l'innovation*, Dunod, 1998, 187 pp.

Budo, M., 'Formateur en entreprise: Quelles aptitudes pour quel métier?', *Gestion 2000*, pp. 111-120.

Conti, C., *Multimedialità e comunicazione formativa*, ISFOL, 1992

from the programmed courses that many of them felt obliged to write, even if this entailed using simplified programming languages to provide content that hardly deserved so much effort, time and therefore money. In this way, every new technology gave rise to an initiation process that rarely went beyond amateurism. The same applies to data-processing techniques, with many trainers believing they would need to be programmers/analysts if they were to be any good at their job.

This confusion between genres has led to a large number of products that came into being as a result of fairly ineffective 'subsidiary' financing.

Various technical assistance offices have evaluated the products of projects developed under European programmes to promote the use of educational software in teaching and training, only to find that the trainers on the ground make very little use of them. One reason is that the laboratory is sometimes rather far removed from the areas of application.

This is very much the case of the Comett (Section C) and Eurotecnet programmes, where the evaluation reports show that participants in the actual projects frequently do not use the multimedia or audiovisual programmes.

1.6.1 The lesson

Traditionally the skill of the trainer resides in his/her ability to divide up a learning content (knowledge, know-how) into basic units of comprehension, retention and assimilation, and to present them to the learner in a logical sequence of reasoning or of interlocking actions to obtain the desired objectives (I know, I know how to). That is the lesson.

For a trainer (to use the generic term), preparing a lesson means writing an educational scenario, i.e. the various stages of the teaching relationship uniting the trainer and the learner during a learning process. A number of courses, textbooks, treatises and summaries are therefore collections of model lessons proposed to the trainers to facilitate their job.

1.6.2 Teaching aids

Within an educational scenario, which establishes the main theme of the lesson, the trainer 'invents' countless methods of presenting the content. From the early days of the 'lecturer' who read 'his' book to impoverished students, to the present-day lecturer who does the same using hand-written transparencies or other sophisticated material while the students read the same text in their own books, many teachers have, fortunately, innovated by using illustrations to support

their at times poor speaking talents. That was the first step. Others have gone further by replacing some parts of their lectures with demonstrations, the use of materials, authors' quotes, meetings with visiting experts, and so forth, and in particular by using the learners themselves, for by skilfully provoking and exploiting their reactions (questions, comments, criticisms) they could give the 'class' the impression that they were learning things they already knew, that they knew even before the lesson started.
Another step many trainers take is to have themselves replaced within the teaching relationship by other trainers, in the form of audiovisual presentations. This requires skills other than the ability to teach a lesson.

1.6.3 Associated skills

The traditional teacher training colleges forced teachers to learn music theory and to play a musical instrument before they could give children singing lessons. This is no longer the case.
At a time when most of these children have a whole arsenal of means of listening to, reproducing and creating music without being musicians, it is in fact no longer necessary to have any skills in this field. The same can be said of all the so-called new technologies (audiovisual, data-processing, telecommunications).
Although it is becoming increasingly necessary for learners to know how to use the domestic equipment they encounter on a daily basis, this knowledge cannot be the main criterion for evaluating the trainer's skills.

1.6.4 New skills

There has always been a proliferation of new schools, new educational systems and new teaching methods in the field of education and training.
So it is not surprising that the modern technologies expect new skills of the trainers, a new ability to incorporate them in their educational messages.
This has long been confused with dexterity in handling wires, screens, tapes, CDs, the mouse, without blowing the fuses!
The current general, collective term for these skills is the engineering of training. At the AFPA[10], the *Vocabulaire technique de la formation*[11] describes it as 'all the methodological and coherent steps that apply to the design of training schemes and/or measures to effectively achieve the set target'. That includes 'the analysis of the demand for and needs of training, the

10 Association nationale pour la formation professionnelle des adultes – Adult Vocational Training Association.
11 *Vocabulaire technique de la formation*, Paris, 1997.

design of the training project, the measures to be implemented, coordinating the implementation of these measures and, finally, evaluating the training'.
So these are areas that are situated upstream and downstream of the lesson as much as within the lesson.
This implies that trainers, whose skills cannot cover each area equally, need to specialise. It also explains the advent in the world of training and education of audiovisual, data-processing and telecommunications 'technicians' who are not really concerned with the field of training but find within it an opportunity to display their design, programming and communication skills.

1.7 The trainer's new roles

This takes us far beyond the traditional roles of educator, trainer, teacher, instructor, supervisor, tutor, demonstrator or organiser.
B. Blandin[12] distinguishes the prerequisites and new skills of the trainers as follows:

- prerequisites:
  - mastery of know-how techniques relating to data-processing and audiovisual tools;
  - communication skills, ability to work in a team;
  - ability to systematise and formalise the various steps into methods;
  - ability to capitalise, to translate their own knowledge or know-how into forms that can be used by others;
- new skills:
  - translating the educational messages into various forms (mediatising);
  - ability to design training systems using the media;
  - leading a project.

These definitions are given as examples. They help distinguish the various roles (not all of them and not all the time) that can be played by the trainer who is no longer the person who knows or knows how to, but is one of the organisers of a 'learning' environment that is open in both time and space.

1.8 The training of trainers

The training of trainers should benefit most from these new educational methods using the multimedia. Indeed, the various directorates-general of the European

12 Blandin, B., *Formateurs et formation multimédia*, Les éd. d'Organisation, Paris, 1990, 240 pp.

Commission that specialise in education and training and in NICT have invested substantial financial resources in the development of numerous projects (e.g. DELTA, Eurotecnet, Comett, MEDIA) in which trainers, not all of them European, have cooperated. Some of them are specifically targeted at trainers. We shall return to this later, but at this point it is worth noting the ongoing study in Italy (ISFOL, Institute for the Development of Vocational Training under the Ministry of Employment) which is based on more than 40 trials conducted in Europe, the United States and Latin America in the field of the training of trainers by self-study or distance learning. Its aim is to define models that can be applied, in Italy, to a future programme for the distance training of various training bodies[13]. This is not always the case elsewhere, where trainers, rather like the shoemaker who is the worst shod, are not always the main beneficiaries of the innovations in their own training. The fact is that the main problem in the Europe of 15 is how to extend, within the Member States, participation in the various European programmes by using in-depth applications to establish a genuine Cyber-teaching system.

13 ISFOL, *Internet e la formazione professionale*, unpublished manuscript, 1998.

Working hypotheses

Drawing on the whole range of documents (specialist publications, newspapers, periodicals, multimedia and networks) of relevance to our experiences in the training of trainers and in distance training, we have set out a number of hypotheses that can help define the new roles of trainers faced with new technologies.

Hypothesis 1

Technological inventions and innovations have at all times produced applications in the field of education, teaching and vocational training.
This is a question of fashion that passes with time and the promoters, pending the next novelty.

Hypothesis 2

The barriers between IT and training are becoming increasingly narrow. The teaching relationship can be informal. The information technicians are, at times unconsciously, teachers who are playing an increasingly important role in training. This produces new jobs for a new teaching 'class'.

Hypothesis 3

Trainers are not sufficiently trained to be flexible and to individualise the teaching relationship.

Hypothesis 4

Rather than a dispenser of knowledge, a model of know-how to be reproduced or a teacher of good manners, the trainer is becoming a designer of training measures that he chooses, proposes, helps choose and makes available to independent and responsible learners.

Hypothesis 5

The budget funds earmarked for software and for educational and training messages are much smaller than those allocated for hardware, for the information highways, which are without doubt used for other purposes too.

Other hypotheses could be put forward, in particular with regard to preparing trainers to design and use the new media. We will return to this in the conclusions.

3

Evaluation of the hypotheses

3.1 Hypothesis 1

Technological inventions and innovations have at all times produced applications in the field of education, teaching and training.

Information and communication techniques form part of this process, through the computer.

This is a question of fashion, that passes with time and the promoters, pending the next novelty.

Between April and June 1998, at the cité des sciences et de l'industrie de la Villette in Paris, l'université ouverte de la société de l'information et des réseaux chose as its subject, 'pour mieux comprendre comment l'informatique et les réseaux modifient la vie professionnelle et la formation' (Towards a better understanding of how computers and networks affect occupational life and training). One could have added 'and the role of trainers'.

While it is true that every technological innovation has produced applications in the field of training, for the past 10 years, thanks to computing systems, we have been witnessing a similar but magnified trend, with the spread of their use from occupational environments to

everyday life. The innovation does not lie in the appearance of new tools, but in their use by so many people, in all fields, on a daily basis, sometimes unconsciously.

Various levels can be distinguished in the field of training, all of which share the same characteristic of aiming to partly replace or supplant the traditional trainer by technicians, training engineers, support staff, designers of training courses.

The first level follows from the longstanding trend towards self-study with the help of programmed courses that reproduce the traditional textbooks in segments whose complexity depends on the scale of the objectives to be achieved. The increase in the number of courses, or 'branches' needed to meet the individualisation of the training, explains why the first generations of computers were used to 'turn the pages' of a book that had become too 'bulky'.

These 'teaching machines' that can guide the learner in his active progress through the maze of sub-branches are new only in the flexibility they offer in the use of programs dedicated to the pursuit of limited and precise objectives. The teacher's monologue is replaced by that of the machine he has constructed and which he controls.

The second level appears at the moment when the machine no longer recognises the key words of its program in the learner's responses and has to react by comparing them with the memorised responses of other learners. This cannot be done by the early machines that are restricted by their program (for instance, educational television supported by an accompanying course of study); but it can be done with a tool that gives access to other sources of information and can be interactive. The teacher's monologue gives way to a colloquy in which other players are involved (other computers, calculators, spreadsheets, encyclopaedias, dictionaries). From that moment on, we are dealing with the multimedia; at the request of the learner or of one of the memorised programs, the computer screen becomes the interface of images and sounds that form part of the 'lesson'.

This leads to a third stage of interactivity:

- functional interactivity. The student is the main player in his learning process. He applies the various tools put at his disposal to help him think, reason and select;
- relational interactivity through a steering program that compares the learner's progress with that of virtual learners selected by the media and who act as models to be followed.

Among the various tools put at his disposal, and that of his class which is also virtual, he may see appear the picture of his 'coach', who helps him out, encourages him, follows up his training and, should he so request, evaluates it; he is the modern-day private tutor who has become an integral part of the screen, one window among others.

The cycle is closed with the return of the trainer, somewhat forgotten in this deployment of technological resources.

Is this interest in the computerised 'teaching machine' and all the automatic and magical aids it offers just a question of fashion? It is true that simulation techniques were developed during the same period. We are not speaking here of sophisticated machine simulations (planes, flexible machine-tools, etc.) used to train operators with a view to ensuring security and saving money, but rather of the reproduction of real situations where one pretends, acts 'as if' one were responsible for the human resources of a real company or were its financial director or head of sales. These company simulation methods first appeared with the advent of role playing, of case studies or, in broader terms, of group techniques in artificial environments. In them the learner finds the parameters of a real situation and acts as he would in real life. In Italy, many works have been published[14] describing this methodology. In Germany, it has been applied to such a degree that the simulation has been backed up by entering the 'staff' of these simulated companies in the social security registers.

3.2 Hypothesis 2

The barriers between IT and training are becoming increasingly narrow. The information technicians are, often unconsciously, teachers who play an increasingly important role in training. This produces new jobs for a new teaching 'class'.

The Community activities relating to educational multimedia (task force report) have given rise to the development of various Community programmes, involving both traditional trainers (Socrates, Leonardo) and sound and image specialists, that make increasing use of computers (MEDIA, INFO 2000,

14 Notably:
Giacomantonio, M., 'Un campo virtuale per lo studio in rete', *I. S. Informatica & scuola*, No 1, March 1997, pp. 40-43.
Montedoro-Sacco, *FaD: una strategia formativa per il futuro*, Franco Angeli, ISFOL, 1993, 142 pp.

Raphael) in order to produce educational messages[15].

These activities form part of trends that have long since existed in the world of cinema and above all of television, where directors, scriptwriters and producers go beyond the dimension of entertainment. From that time on, it clearly became necessary to accompany the film with written documents designed to make up for the speed at which the message flashed across the screen and to consolidate the teaching relationship (contact by post or by tutor in a training centre), particularly at the moment of evaluating the acquired knowledge. This trend was bound to become stronger with the advent of technologies for copying messages at home or at work, and above all with the spread of networks of transmission systems using both longstanding methods (electrical and telephone networks, cable TV, satellites) and transmission without wires.

It is probably an exaggeration to say that new jobs arose for the teaching 'class' as a result of the interest these makers of films and TV programmes took in training, for on the one hand these creative talents include teachers who have broken away from classroom and school teaching and, on the other, information specialists, journalists, photographers and sound engineers who are already involved in a system of continuing education outside the school framework. There remains the question of whether the two groups get along together and do their best to participate in the joint project teams in accordance with their skills. A number of European projects developed by the 'media' centres offer their services to multimedia producers to train them 'to master the narrative forms of interactivity, team leadership, the technical aspects of CD-ROMs and other products relating to websites (University of Bristol Media Centre), training in interactive writing for the multimedia market (Hochschule für Fernsehen und Film, Munich), distance training in scriptwriting (London), training in the management of multimedia projects (Science and Technology Park, Salerno), and so forth. There are a great many others, some of them on the Internet (for instance, Euroscript: www.euroscript.co.uk).

These current initiatives reflect the trend in the 1980s in the United States and in Europe to encourage trainers to use computers and audiovisual aids in training colleges and centres. In 1995, in the United States, it

15 European Union, fifth framework programme of the European Community for research, technological development and demonstration activities (1998-2002), accessible on Internet: http://europa.eu.int/comm/research/fp5.html.

was estimated that 11 % of annual expenditure on education would be used to acquire one computer per five pupils, at a time when most of the computer manufacturers were putting less expensive Internet terminals (network computers) on the market. In spite of these considerable efforts and of the rising number of players involved in training who can help develop the essential software, it is clear that educational software is still too sparse on the ground, which is why the European Union noted the 'difficulty of incorporating the educational multimedia in teaching practice and the teachers' lack of training and information on the subject'[16].

The recommendations based on these findings describe projects to disseminate the educational multimedia, together with accompanying measures (protection of intellectual property). Once again they concern infrastructure development and cooperation between countries. And they also allude to the financial incentives required to support the educational applications, failing which these highways, on which there is all too little sign of educational software, will not fundamentally change our ways of learning and teaching.

16 Lips, B., 'Exister sur Internet en Belgique', *Best of Editions*, Brussels, 1997, 431 pp.

3.3 Hypothesis 3

The trainers are not sufficiently trained to be flexible and to individualise the teaching relationship.

While the lesson remains the learning unit, the classroom remains the primary interlocutor of the teacher or trainer. This term covers all the relations and exchanges between the learners and their trainer (who is also assumed to be unique) in an educational situation. So it was quite logical to adopt this term to designate all the students using the same training media over a same period – to be defined – and in different places. However, this 'virtual' classroom has none of the characteristics of a group of students, since none of its members has any contact with the others and, at best, the trainer is the passive witness of the students' 'trials and errors', except on the rare occasions when they ask their 'coach' for help or advice.

There was a time when the public authorities were particularly interested in teacher training. The extension of the statutory school-leaving age (to age 12, 14, 16, sometimes 18) demanded more teaching staff and raised the number of pupils and students. With the rise in the standard of living of workers, young people did not need to enter working life so

soon and could continue their education beyond the statutory period. Special teacher training schools set up complex systems for the recognition and certification of the vocational skills required to teach at primary and secondary school level, together with the corresponding quality labels.

The lesson *à la Herbart* imposed a homogenous learning model on everyone.

Rather curiously, the population decline and the financial difficulties facing some industrialised countries were to call into question this strategy of both quantitative and qualitative improvement. The teachers' jobs became insecure. Their social position declined. Increasing use was made of 'unqualified' teaching staff. In vocational training, qualified staff no longer found the same recognition for their teaching abilities that the schoolmaster used to enjoy. This had certain implications for the continuing education of trainers. They had to expend their own time and money if they wanted to improve or correct their professional qualifications. This was particularly true with regard to information techniques. It was to take much time and effort to persuade trainers that using computers and audiovisual aids in their teaching did not mean becoming a computer scientist or video producer; it meant learning how to become part of a team creating educational software instead of a teacher, side by side with experienced scriptwriters and technicians or, more simply, learning to incorporate these teaching aids in their personal training message.

The trainer is not short of creativity. A glance at the entire libraries of published or, more often, unpublished textbooks makes this apparent. For decades these publications by individuals have been repeating the same teaching methods, instead of looking at the genuinely innovative trends led by production teams using multimedia in which trainers 'by profession' are rarely the driving force.

We cannot hold that against them, given that since their initial training they have been accustomed to act as the main source of learning for successive groups of learners.

3.4 Hypothesis 4

Rather than a dispenser of knowledge, a model of know-how to be reproduced or a teacher of good manners, the trainer is becoming a designer of training measures that he chooses, proposes, helps choose and makes available to independent and responsible learners.

This hypothesis is frequently repeated in the documents we have consulted, as it is in B. Blandin[17]: 'Faced with the media, the trainer has in turn become a librarian, a researcher, then a systems operator and programmer. In the near future he could become a media assembler and manager of individualised training courses'.

The use of the conditional tense in the above quotation is understandable and although the text is some years old, the statement still applies. This change in the role of the trainer relates to some teachers, whose numbers are no doubt growing, while the others continue to occupy a central position in the teaching relationship. And yet the new educational techniques do offer a good chance to move 'from words to deeds in the context of differentiated educational methods and of individualisation'. They offer a chance to update practices that rely far too much on exposition. 'He (the trainer) will become a learning facilitator rather than someone who endeavours, often without much success, to give form'[18].

As for the 'independent and responsible' learners, it is clear that the new media are also transforming their attitudes towards the content, just as they are transforming the techniques and equipment with which the learners have become familiar through computer games and which they risk confusing with the messages conveyed. Self-study needs to be learned too. It should not be forgotten that one disadvantage can be that the use of multimedia increases the isolation of the learners who, especially in the case of vocational training, need the encouragement and assessment of their results provided by tutors who form part of the learning environment.

So trainers will not disappear overnight, yet their roles are changing and multiplying in the face of the enormous investment being made in telecommunications and also of the many SMEs that have been set up to form multimedia resource centres . Every year, at the Barbican Centre in London, these SMEs (as also some large firms) exhibit their products in a wide variety of fields (not just education) and show that real markets have been created, including an employment market.

A visitor to the exhibition might think everything had been done, everything exists, that all that remains for those in charge of training or, more broadly, education is to buy the multimedia in question and offer them to

17 Blandin, B., *Formateurs et formation multimédia*, Les éd. d'Organisation, Paris, 1990, 240 pp.

18 Lenoir, H., 'Multimédia: entre mythe et réalité', *Le Journal du Multimédia*, No 22, October 1997, pp. 8-9.

schools, to training centres, to firms, or at home to docile and motivated learners. But it is not as easy as that.
From this hotchpotch of media, those that correspond most closely to the desired objective have to be selected. Making these choices presupposes a particular skill on the part of the those involved in training, namely the ability to evaluate the qualities of the media on offer on the basis of educational criteria linked to certain objectives and methodologies and to the available resources.
Next, the chosen media need to be incorporated among teaching aids that can be accessed to achieve the general objectives, with particular reference to traditional aids, some of which still have a part to play. The real must not be confused with the virtual.
Lastly, these solitary or individualised training courses need to be supplemented by an act of intelligence, situating an individual's learning difficulties in the context of the collective efforts of other learners.
In the training of trainers, these new skills are often confused with the trainers' ability or not to handle techniques, master data-processing, produce educational software themselves. Although it is true that production teams are sometimes short of teaching skills, that is because they cannot often enough find teachers capable of taking part in this joint effort.

3.5 Hypothesis 5

The budget funds earmarked for developing software and educational and training messages are much smaller than those allocated for hardware and for the information highways, which are without doubt used for other purposes too.
One has the impression in Europe that the Internet appeared out of the blue in the late 1960s. But at the time, this product of American university research, largely financed by the US Department of Defense, was already more than 15 years old. At first this network linked up large centralised systems via telephone lines, serving thousands of users from terminals, on the basis of shared resources. Very soon, many students developed the tools offered by the Internet, the first of them being the TCP/IP protocols that define the identity of the computer and its means of communication. Like radio hams, these students set up all kinds of contacts, and worked countless hours, usually unpaid; and they are certainly responsible for the spectacular growth of the Internet: 96 countries directly connected, 179 countries accessible at least by electronic mail.
This success, which is enormous and still growing, takes account only of the number of connected

computers, while the number of users – 33 million in 1997 – is only an estimate[19]. Some people double that figure, perhaps in a spirit of proselytism, for the 'internauts' do tend to practise their art like a religion. What becomes of training in this technological explosion?

Quite logically, given that universities were the point of departure for this development and the US Science Foundation (NSF) provided it with new impetus, 36 % of the first applications related to education, although this was not the largest percentage (42 % related to commercial activities).

The Internet is not the only telematic information network. The reason we chose it is obviously because the most recent literature and applications assign it a leading role and because we believe it is still in a growth period and represents the prototype information highway, one of the ways forward in distance training and self-study. We have also presented it because it belongs to nobody and that in a sense one takes potluck, which means one can only find in it what others have put in it. In the area that concerns us, i.e. the position of distance training in the new training of trainers, we believe two remarks can usefully be made.

One can find everything and nothing on the Internet. The fact of appearing or not appearing in files says nothing at all about the quality of a 'product'. Following the practice of ISFOL in Italy (associated with Scienter), we must therefore begin by defining the content of the training of trainers' programmes and formulating it on the basis of precise objectives[20]. In fact one all too often has the impression of 'surfing the Internet' as though adrift at sea, which is why it is difficult to find the links between pages, images, graphs, etc. which were not created for that purpose.

Once again, when the public authorities discovered the means the Internet provided of cooperating with teachers in schools and training centres, this led them to adopt the system of networks (thousands of terminals were set up in schools!) without having prepared the training staff or defined the position or functions of these new information sources within the training course.

19 According to data provided by the Paribas bank, the number of Internet users in 1989 was 52 million in North America, 38 million in Europe and 40 million in the rest of the world. Their estimates for 2003 are 100 million, 98 million and 152 million respectively, making a total of 350 million users.

20 Dondi, C., *Connaître le Sanpaolo*, discussion document for the International Labour Office, Geneva, 1990, 9 pp.

Those who expect the use of the Internet to reduce the rate of failure at primary and secondary school and to produce better results in basic retraining and continuing education will probably be very disappointed – unless, and this is a fear expressed in some teachers' unions' publications, this is an attempt to replace certain trainers with 'teaching machines'? Nevertheless, and despite the remarks and in particular the reservations expressed, it remains that the networks exist and have one considerable advantage; as L. Rodriguez-Rosella, President of the Management Committee of the DELTA project in 1991 put it, 'they have no frontiers'.

But if the trainer does not forfeit his direct relationship with the learner when the latter spends more and more time 'surfing' the networks that have been set up, what will his role become? There is a variety of possibilities. In in-house training, the trainers or tutors involved could become the managers of individualised training courses using the firm's own network and 'made-to-measure' educational software ordered from specialist companies whose staff also include graduate training engineers.

As for initial training, it remains the unknown quantity, for many of the training objectives here (know-how, attitudes) are rarely encountered by the multimedia.

Let us hope that funding will be allocated to help pass on the values of European citizenship to future generations through software adapted as best possible to the teaching relationship of the time.

4

Conclusions

Other hypotheses have been put forward on the basis of solid professional experience both in the use of the media and in the field of education and training. The following seemed obvious.

The trainer uses the media in his own training in the same way that he uses them in his activity as a trainer.

This hypothesis, which we mentioned earlier (referring to the badly shod shoemaker), may seem ambiguous, for the expression 'in the same way' could in fact be understood in a positive or negative sense. Leaving aside some ongoing projects originally developed by training organisations rather than by actual trainers, we have scarcely ever encountered 'training the trainers' projects that received any significant help from the media. The increase in the number of media opens the way to individual choice and self-study.

This is almost self-evident. However, it seems that the abundance and diversity of technological resources is not necessarily reflected in a greater number of responses in terms of applications. Some publications sometimes give the impression that flexible programme production units have been set up to produce products worth having.

The use trainers make of the new media varies greatly according to their level of professionalism.

This 'professionalism' (in the Italian sense of *professionalità*) is associated with the concept of 'expertise', of knowing one's trade. It does not seem likely that the effectiveness of a training system can be measured by the number of Internet sites that are occupied or by the number of sites occupied on satellites dedicated to education, in the same way that the statements made by a very well-known academic who boasts of not having a television at home sound doubtful.

The new media have a tendency to enhance the trainer's function as evaluator.

In the school environment, the evaluation of educational results has always been an important aspect, not so much because this was and remains the conclusion of the learning process but because it represents the 'official' recognition of the results obtained. Whole institutions have come into being (such as the baccalauréat in France) to formalise, sometimes to an extreme degree, the form and content of these examinations that lead to the acquisition of

certificates and diplomas. In vocational training, on the contrary, perhaps because the acquisition of know-how can be verified more easily in its applications, the evaluation of results has often been neglected. The use of the media has modified this 'indifference' as to the results, not just because the interactivity of the message presupposes an evaluation of the learner's intervention, but also because it compares his responses with others. This exam-based approach, which began with the development of programmed instructions, was to lead even further, to the evaluation of the teaching itself (a good lesson is one in which 80 % of learners produce 80 % of correct answers – Skinner). Most of these programmed instructions contain their own system of evaluation (initial, interim and final tests), especially if they are applied by computer. Yet it is rare for them to be accompanied by a system of standardisation that enables the learners to compare their results with those of the 'virtual' classroom of which they are a member.

Although it is easy to count the number of trainers and learners who are 'regularly' enrolled or working in training colleges or centres, it is less easy to count the number of those using 'alternative' training systems, on-the-job training, courses of training open to all, linked work and training, etc. It is quite impossible to evaluate the total number of students sitting at home engaged in basic or advanced training in front of their screen, with their manuals, their cassettes, etc. and their huge determination to succeed. This situation, which is common to all the industrialised countries, raises several questions.

- Is this plethora of means of education and training within the reach of all members of society? Do these new means of training produce the democratisation that has been an issue for so long? Or, on the contrary, are they once again mainly within the reach of the affluent society, of those who already have certain resources? Do they merely educate the educated even further?
- The inventions and innovations in the field of electronics, computers and telecommunications continue to multiply. Soon we will be able to speak to our computer, our trainer, via the little window of the screen. The methodology for managing these new teaching relationships still needs to be developed, for so far we have little more than adjustments of the traditional questions and answers

system to the new technologies (especially speed of communication).

Is the little mouse that we move around in front of the PC screen a herald of this new method?

- There was a time when people predicted that the skilled worker would disappear to be replaced by a programmable robot. The factory would no longer need workers but be run entirely by flexible systems obeying the commands of high-flying computer operators. As in the case of working from home, the idea was that training would be distributed throughout the world through a wireless network. But what would happen to the traditional trainers in this 'best of all worlds'?
- On a more realistic note and closer to home, how would these training systems cohabit, one traditional, with its own organisation, timetables and certification system, the other individualised, flexible and esoteric? Is it at all conceivable to integrate these systems, which would involve a fundamental rethinking of their programmes, organisation and certification system? If we exclude from the population the small percentage who are unconditionally against innovation, what proportion of Europeans are ready for these fundamental changes? In particular, will firms continue to take part in initial and continuing block-release training when the school system has become technologically obsolete?

Looking through the documentation, we have not found these questions, and far less any answers to them.

And yet the 'Net' is everywhere. The newspapers devote special pages to the presentation of multimedia innovations; television programmes do the same, interspersing them, it is true, with video games. Cybercafés are opening their doors and their screens to the young and not-so-young. Publishing houses are setting up departments specialising in educational and cultural CD-ROMs in the various European languages. As Michel Serres said to a journalist from *Le Monde*: 'We are at the year nought of a new way of sharing knowledge'.

What will happen to the trainers during these slow but inevitable processes of transformation?

Rather curiously, we have no idea. Publications 'on the ground' are written by the profession itself (defending it) or by the champions of change who praise the merits of the new educational and training techniques with all the fervour of the converted. The majority remain silent, although we know that a great many innovations are born of the numerous

experiments quietly conducted by certain enterprising trainers.

It would be interesting to know the attitude of trainers of all levels, from all backgrounds, from all initial training systems towards the use of the new educational and training media in the various European Union countries.

What is becoming of the trainers of trainers?

Are they becoming the champions of change or do they defend the status quo?

The training of trainers does not account for the main part of the education budget and it is often confused with technical retraining, or it sets itself socioeconomic or political objectives that no doubt comply with the trainers' wishes but have little bearing on the emerging changes to their role. Perhaps this kind of neglect is a warning sign of the difficulty of preparing new trainers to accept a different teaching relationship.

It would no doubt be useful if, starting from the concrete achievements of trainers attached to centres open to the general public or involved in distance training, we could define systems for integrating multimedia in the arsenal of teaching methods used by trainers.

But there is a moment when the trainer disappears or more precisely when the learner becomes the trainer.

As we said, self-study is something that has to be learned. Very often, faced with the textbook he has just bought, or hearing himself constantly being corrected by the tape recorder, or in front of a screen that tells him where he has made a mistake, the learner becomes discouraged and vainly looks for a tutor to set him right. The self-taught learner has to know how to choose his aids. He has to know how to evaluate them, to supplement them with his own work and by participating in training collectives, and lastly he has to know how to assume his independence.

This is easy for the well-balanced learner in a comfortable professional situation who feels successful. It is quite different in other cases. In those situations, the learner needs assistance, because he is looking for a comforting presence as much as for knowledge and know-how.

There has been talk of an 'allergy' to machine-assisted training on the basis that it prevents the learners from achieving their training objectives. Is that true or just an excuse?

It is worth checking this and defining the reasons for these difficulties.

Knowing the trainers' attitude towards the use of the new media in education and training, describing

systems for integrating multimedia into the arsenal of teaching methods, defining the limits to using these methods in relation to certain characteristics of the learners – these are certainly interesting subjects of study for the future. But such studies are carried out within the formal context of the traditional education and training systems. These systems are now undergoing the same kind of fundamental transformation as the documentation relating to them. In the last three months of 1998, purely by chance, two French publications[21], one 'scientific', the other 'popular'[22] tried, whether directly or in a roundabout way, to determine the real or expected transformations in the teaching relationship following the use of the new media in training. They only refer to the specific skills required by the trainer in relation to the Internet: learning to 'surf' the web becomes a skill to be acquired by the trainer (and by each learner). To that must, however, be added:

- learning about the image (its new status beside the word);
- distance learning (the real and the virtual);
- going beyond the different forms of knowledge, know-how, knowing how to be, the definition of interacting trees of knowledge (towards a new form of citizenship).

In these and many other publications (e.g. special features in many newspapers and periodicals), we should also note the following.

- Over and above the new skills we have described, it would be interesting to draw up a list of the particular skills expected of the trainer in his new role of mediatiser.
- There is still some confusion, particularly in the statistics, between correspondence courses and distance learning, between training centres open to all and the use of the multimedia in an interactive, individualised teaching relationship.
- Finally, it is true that the key area of a learning system is the 'playground' or mutual education. Just as those accustomed to attending seminars and colloquia say at the end of the day that the most interesting time was the coffee breaks, distance learning carries the risk of depriving the 'virtual classroom' of the warmth of proximity. Will the

21 Centre INFFO, 'Actualité de la formation permanente', No 156, Sept-Oct. 1998, Dossier 'Formation ouverte à distance'
Le Monde de l'Education, Apprendre à distance, special edition Sept. 1998.

22 The adjectives 'scientific' and 'popular' refer only to the origin of the publications.

coaches and the tutors invent a method of compensating for the coldness of telecommunications? That is another story, one which the journal *Trends-Tendances* of 28.2.1999 called a 'Website story'.

Note on methodology

As we said earlier, the object of this paper was not to draw up an exhaustive list of publications that, under one heading or another, reflect innovations in preparing the trainers to use the new media.
On the other hand, we have had a chance to evaluate a great many documents and we have tried in the above to show their positive contributions.
Whether a work does or does not appear in our bibliography should not be regarded as a judgment as to its quality, given the number of documents we had to consult in a short space of time.
That is why this paper is not in the form of a series of necessarily biased and limited quotations but offers the following:

- an 'inventory' of major publications on the European market;
- references quoted by authors as a secondary source of information;
- references to publications that can be found on the Internet.

We have certainly given pride of place to French- and English-language publications, but the same is true, quite generally, of the works produced by the European Community bodies that are particularly active

in this field, such as the publications of the DG XII 'Information Society' programmes (the fourth one ran from 1994 to 1998).

Again, the same applies to publications by bodies responsible for education and training, in the framework of well-known programmes (Leonardo and Socrates), or some that are less known such as MEDIA II and INFO 2000 which are designed to create links between the traditional trainers and training engineers.

In the field covered by this study, we must certainly note the works of the task force concerned with educational and multimedia software which, since 1995 and at the initiative of the Commission, has been analysing the situation, market and uses of educational multimedia in Europe and proposes lines of action in its 1996 report. The report takes the form of a list of 6 findings and 15 recommendations on the use of the multimedia at different levels of education and vocational training[23]. So it can be regarded as the *ne plus ultra* of information, even if one periodical uses the same term to welcome the return of the tutor to the screen in the midst of images of all kinds.

23 European Commission, DG XXII, *Open and distance learning in the EU Member States*, 1996, 20pp.

The first part of the report is based on 6 findings:

1. the emergence of family education multimedia;
2. the European commercial supply of educational multimedia;
3. the potential for the use of the multimedia in primary and secondary education (teacher training);
4. the university as a laboratory for new forms of teaching;
5. the multimedia in the service of educational innovation;
6. the heterogeneous needs of vocational training.

The second part of the report puts forward 15 recommendations:

1. to facilitate, by the year 2000, access for all to multimedia material (teachers, students, libraries, firms);
2. to discuss these objectives at all levels of action;
3. to mobilise and coordinate the Community initiatives;
4. to define priorities for the programme 'Telematic applications' (thematic and innovative applications);
5. idem for the programme 'Information technologies';
6. idem for the programme 'Finalised socioeconomic research';
7. idem for the programme of international cooperation (developing countries);
8. idem for the programme 'Training and mobility of researchers';
9. idem for the Socrates programme;
10. idem for the Leonardo programme;
11. idem for MEDIA II;
12. idem for INFO 2000;
13. idem for the use of the Structural Funds and the trans-European telecommunications networks;
14. to formulate measures aimed at making the educational multimedia available to all;
15. to simplify access to works and services by managing and protecting the creators' intellectual property.

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Glossary

These very common or less frequent terms are used without prior definition or with different meanings. This brief glossary could certainly be expanded. Some have tried to do so[24].

@

generally called 'at' is used in an electronic mail address to separate the 'user', who is the owner of the electronic box, and the 'host', the name of the server that collects the mail.

Apprenticeship

System of learning a trade or profession on the job. Often accompanied by short periods spent in a training establishment (training college or centre) responsible for theory training, evaluation and certification.

CD-ROM

Compact disk read only memory.
Designates compact disks that cannot be overwritten and that contain audio or computerised data.

Coaching

'Direct' support for the learner engaged in distance self-study from an expert in the field when his presence is requested.

Designer (in vocational training)

The person who identifies, analyses and evaluates needs (budget?), and who selects and sometimes designs the means of achieving the given targets.

Extranet

(To be interfaced with the Internet and an intranet).
Makes it possible to extend the functionalities specific to in-house communication to a base of external 'clients'.

Group ware

Server of electronic information or message service dispensing training modules.

Hypertext

Process that makes it possible during a course of reading to consult linked commentaries thanks to a system of cross-references (and to return to the initial page).

Informal training

Training as a result of educational measures organised by the enterprise or training organisation.

24 AFPA, *Vocabulaire technique de la formation*, Paris, 1997.
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Lips, B., 'Exister sur Internet en Belgique'. *Best of Editions*, Brussels, 1997, 431 pp.

Interactivity
Potential state activated by educational situations in which the learners, teachers and sometimes the content of the training interact.

Internet
Means of communication and exchanges physically supported by computers interlinked in an enormous network in which (as in the case of the telephone) each point can communicate with another point.

Intranet
Internal network (e.g. within an enterprise) comprising a central location to store the training modules.
The intranet uses protocols derived from the Internet (TCP/IP) for geographically demarcated environments.

Just in time learning
Participation of the tutor (coach) at the learner's request.
Five minutes coaching: variant of intervention during work.

Logo
This programming language dating from the 1970s was the nth 'incarnation' of an educational trend that focussed on learning processes guided by the student.
The same trend is found in the context of the interactive multimedia.

Multisupport
Combined use of various media: text, tapes, EAO software, Minitel, telephone, CD-ROMs, teleconferences, etc.

Multimedia
Collection on a same computerised medium (generally CD-ROM) of text, sound and fixed or animated images.

Pass band
The quantity of information that can be transmitted in a given time (represented by the section of a tube in a system of channels).

Professionalism (in Italian: *professionalità*)
Term denoting the dynamic synthesis of the skills needed by an individual pursuing a particular profession.

Protocol (TCP/IP protocol series)
Formalisation of communication systems independent of the type of computer.

Reference library
Body of documentation including a glossary and encyclopedic references accessible via the computer screen.

Server
Generic term to designate a computer that serves a group of users with products such as electronic mail, access to files, access to the Internet, etc.

Surfing the web
Navigating from page to page or site to site on the Internet.

Trainer
General term to designate a person or system responsible for the vocational training of a learner.

Training engineering
Everything that goes beyond the role of the trainer in his teaching relationship (analysis of needs, selection and protection of means of evaluation). It can include the marketing and sales of training schemes in a commercial training enterprise.

Tutor – on the job
Occasional or institutional trainer responsible for the educational and technical follow-up of the learner (on the job or at home).

Video conference
When linked to a video, PCs are in contact in a teaching context and link up sound and image, learners and teachers, usually on the Internet.

Virtual
'Simulating reality' or 'potentially real'. This term which was initially used for computer graphics has now acquired a wider meaning. In general it describes the various 'objects' derived from the use of the multimedia: teaching a virtual classroom, visiting a virtual museum, consulting a virtual encyclopedia, flying a virtual plane, etc.

WWW (world wide web)
The principal Internet information service since 1990. A collection of documents interlinked by hypertext.

1

Criteria and parameters for the identification of innovation in the field of new technologies applied to education and learning

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Context and subject of the study

This study was commissioned by Cedefop and aims to provide a working frame of analysis, i.e. a problem-based reference framework, which can be applied to training projects that use new technologies and that appear to be 'transferable innovations' at the European level.

The term 'training project' mainly refers to training measures based on the use of a network of technologies which provide novel and effective responses to the problems surrounding the conditions of access to competences.

This frame of analysis or reference framework should make it possible to define criteria for identifying and selecting transnational projects that have produced innovation in training processes and/or products through the use of information and communication technologies (ICTs). Such projects:

- are truly innovative in that they combine existing resources in a novel way that steers training systems towards the best responses to needs;
- can, in practice, be effectively transferred within the different organisations and cultures of the European Union.

The study is therefore in line with the setting up of a

European observation system to survey innovative vocational training practices, 'to facilitate the exchange and dissemination of good practice and innovative projects within the European Union'[25].

The aim is to 'ensure the most effective accumulation of Community added value in terms of innovation produced by transnational projects ... through capitalisation of knowledge on the conditions for the production of this added value'[26].

This field of study thus represents a necessary stage in the implementation of one of the essential objectives of European training policy as redefined by the Maastricht Treaty: the construction of a 'common education and training area', which presupposes the existence of a reference model or paradigm for the innovativeness and transferability of projects supported by the European Union.

Problems arising from the context: Method for the innovation – training – ICT link

Logic here seems to call for a traditional approach: start with a general definition of the concept of innovation and then apply it to the two other areas covered by this study (training and information and communication technologies); this has already been attempted by various experts a number of times.

In a recent working note, Cedefop proposed a definition of innovation as 'the production, assimilation or exploitation of training products or practices, in a multidimensional process between partners, which constitute improvements or successful responses/solutions – going beyond usual practice – for problems/specific needs in their context (both spatial and temporal), and which are capable of being transferred to other contexts'.

This approach, however, is at odds with the complexity of the phenomenon 'innovation' and with the impossibility of reducing it to a working – i.e. limited – definition.

The practice of innovation, even though it always presupposes a rupture and the introduction of a novelty in an existing system, cannot be reduced to its novel

25 European Commission, White Paper 'Teaching and learning. Towards a learning society', Luxembourg, EUROP, 1997, 107 pp.

26 Cedefop, June 1997.

aspect, nor does it allow itself to be defined through the 'product', i.e. the new action or technique put into operation. It has to be seen as a particularly complex process entailing the emergence – within a defined system, and in contravention of the usual functional rules – of a response to a given problem.

The concept of innovation 'in general' also seems to be as difficult to pin down as the extremely complex phenomena of the emergence of a scientific 'invention' or a change in social model.

The approach we propose in this study will try to advance reflection on the subject by integrating the parameters that have been identified as crucial for the innovation process in an enterprise. It is thus a synthesising and combinatory approach in three stages:

- establishment of a working definition of innovation in enterprises, the product of contemporary work on economic sociology;
- identification of main developments in the training function in productive organisations, in association with new data on markets and work environments in the international economy;
- construction of an approach combing the three elements: enterprise, training, and information and communication technologies, which is the only way, in our opinion, of proceeding towards a concrete answer to the question asked.

3

The paradox of the question asked

Here, we are faced with several statements that must be carefully formulated before we can proceed with this study.

1. There is a contradiction between innovation and transfer because innovation is by definition non-reproducible.
2. While innovation is the pre-condition for the development of the enterprise, within the framework of training systems, it very often remains an isolated social practice, not integrated, not incorporated into the system, and thus incapable of acting as a stimulus.
3. The use of information and communication technologies in European training projects is often presented as a key factor in the development of new knowledge and new competences in a transnational context.

This linear view – undoubtedly because it gives too much priority to the potential of the tool – discloses several weaknesses, underlined in a report from DG XIII[27]:

27 European Commission, DG XIII, *Brainstorming session in future multimedia skills*, Luxembourg, 1996.

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- weakness in knowledge of the technologies, their specifications, their functionality and their environmental demands;
- lack of consideration of critical factors linked to the conception and support of open and distance learning;
- lack of awareness of pedagogical issues associated with transnational processes and the tripartite relationship between learners, trainers and technologies;
- absence of a 'market approach', integrated in the development of the project.

These weaknesses are proof – at the moment when the 'information society' is taking shape – of the need for a profound critical review which will facilitate the fully controlled and sustained introduction of the information and communication technologies in the training process.

The example of training projects which present the establishment of multimedia systems as a response to the problems of SMI/SMEs, the job integration of disabled youth, or even equal opportunities for men and women in a work situation is, in this connection, particularly significant: in actual fact, the mere introduction of the most sophisticated computerised and telematic tools will never suffice, on its own, to guide an enterprise or an organisation towards a solution for the needs expressed at the beginning of these 'innovations'.

4

Towards an operative definition of innovation

4.1 The logic of innovation, the logic of organisation

Every enterprise, in its daily functioning and its development strategy, experiences, in some way, an encounter between two systems of logic:

- the logic of organisation, which tries to 'optimise available resources at a given moment by setting up a rational programme' of operation and development (Norbert Alter). This logic of organisation, constantly trying to cope with the constraints of competition, the environment, local practices and customs, is more geared to rationalisation than a perfectly rational system of action following Taylorian principles;
- the logic of innovation, which has to be perceived as the attainment of **new combinations** of the different resources of the enterprise, i.e. production methods, market, corporate organisation, raw materials or semi-finished products; here a distinction must be made between innovation and invention, the latter implies the birth of a new resource, whereas innovation consists of integrating this new resource in a product put on the market; the function of this process in the enterprise is **creative destruction** [28].

This approach and the work it has engendered in labour sociology present several interesting characteristics for the delineation of the concept sought:

- new combination of resources: innovation necessarily brings about a rupture in the enterprise when reorganising and reprogramming the function parameters;
- destabilisation before creation: innovation is always part of a clash between risk and routine, the old and the new standards, it is a process which contravenes established rules and incites reorganisation on a new basis. If this holds for the enterprise, does it not also hold, eminently, for the learning process where the destabilisation of the old structures is the preliminary step towards the integration of new concepts. Here we revert to the definition which Bachelard formulated for knowledge as an 'epistemological rupture'. Innovation is thus

28 Schumpeter, J., *Théorie de l'évolution économique*, 1912, French translation Dalloz, 1935

inseparable from the learning process as it is the assimilation of the new by the organisation itself;

- non-reducible nature of innovation: it is born of uncertainty; it creates uncertainty, in other words, disorder; it cannot be decreed or completely controlled. In this regard, it cannot be reduced as such to one of the development parameters in the organisation: in other words, it is not enough to introduce a new economic or pedagogical tool to produce innovation;
- impact on the product: in the same way that the innovation process cannot be reduced to a technological or organisational element, innovation itself cannot be conceived without the final 'product'. Transposed to the field of training, this means that the only thing which can be identified as innovation is a process which results in a usable and widely employable product responding to the 'needs of the market'.

The question which still remains open here is the **guided control of innovation**: if innovation cannot be imposed from above, how can it at least be organised and controlled in enterprises and organisations?

4.2 Innovation as organised creation

The research works we have consulted formalise this process by dividing it into three key phases:

- **initiation phase**: Innovation in the enterprise is viewed as a strategic issue placed under the direct responsibility of the managing directors; at the level of local authorities or even nations, it is primarily considered today to be the responsibility of the executive, in the context of globalisation which is the hallmark of the end of the second millennium, it is usual for innovation to be initiated through the intervention of supranational institutions resembling the nations of a continent. For instance, the European Commission has set up a Community measure to 'strengthen human resources for innovation' [29], a measure which Cedefop also supports through its work on vocational training;
- **assimilation phase**: Innovation is not only the initiation of a process; it also implies the transformation of the initial step by the actors in the field who necessarily reshape it but, in doing so, give it a new sense by steering the action themselves;

29 European Commission, 'Green Paper on Innovation', Luxembourg, 1995.

- **institutionalisation phase**: Innovation is neither complete nor active unless it has been reintegrated in the logic of the organisation, 'reintegrated' does not mean it has been reduced but that it has created a new frame of reference in the operation and development of enterprises and organisations.

In this sense, innovation appears here in its dual form as **creative destruction** and **organisational creation**. When viewing innovation as a process, two key points emerge:

- **the non-linear nature of the process**: Innovation has one notable characteristic: as a non-linear evolution subject to the concomitance of the different phases (objectives, means, results), it needs overall management of the process elements and their interactions. In other words, it assumes the acceptance of the **unforeseeable** nature of the process itself and its outcome, all of which implies 'the closest possible' control. 'In fact, innovation invents its form of organisation without a clearly established reference model.'[30]
- **the central role of the actors**: Innovation compels the permanent mobilisation of the different actors in the initiation, the guided control, the coordination and the dissemination of innovation. In this context, particular attention should be paid to the role of the individual or collective innovator in the organisation, accepted as legitimate and authorised but necessarily detached in order to make things move faster.

4.3 The dissemination of innovation

The work on innovation shows that it is not so much the quality of the product which explains the success of the innovation but its ability to respond to a plurality of interests. In other words:

- **the ability to convey**: Innovation creates an encounter, or even a dynamic demultiplication process, between a new way of doing things and the interests of a given number of actors each following their different professional logics;
- **a strong adaptation of the 'product' to the 'market'**: Successful innovation is one which integrates market development in its own process. In view of this, there is no need for a heterogeneous discussion of innovation in the enterprise and innovation in training.

30 Veltz, P. & Sarifian, P., 'Systèmes productifs les modèles en question': dossier, *Sociologie du travail*. Paris, 1, 1994, pp. 3-98.

5

Anne de BLIGNIERES-LEGERAUD

Evolution trends in the training function

5.1 Training as a process

The best way of operationalising an innovation approach, for the purposes of this study, is to place it in the field concerned – in this case, innovation applied to training projects using new technologies – without separating it from the economic and organisational area where the work of experts has produced fruitful results.

In other words: work on the overall problem 'innovation/enterprise/training' in order to produce a frame of analysis which can lead to concrete selection criteria.

We therefore propose to proceed by first establishing a preliminary definition of the training project itself as the spatial/temporal process consisting of four key phases, comparable to the emergence and application phases of innovation itself in any enterprise or organisation:

- phase of analysis: of situations, of demand, of needs, etc.;
- phase of conception of the training measure: engineering and teaching methods, etc.;
- phase of implementation and guided control: allocation of resources, monitoring, control, etc.;
- phase of evaluation of results: learning outcomes, results of the measure, regulation, etc.;

The necessarily systemic nature of the process we have just described, the sole guarantee of its effectiveness, means that each stage of the training process remains closely interdependent, upstream and downstream, with the four other phases: each problem identified at one of these links in the chain has an impact on the measure as a whole, just as any change introduced within the measure leads to a substantial modification of the process as a whole.

But, the training processes themselves, if they are to respond to changes in work or employment and consequently to the new competences arising from these developments, are compelled to undergo continuous adaptation, or even a constant anticipation of needs.

5.2 The change factors of training

The lines along which the resulting training processes develop can be discerned from the three factors analysed in the report on professionals in training[31]:

- **The 'learning organisation' factor**
  The aim of the learning organisation, designed as a permanent learning system, is to develop the flexibility, reactive capacity and adaptability of the organisation and of people. The objective of training is the development of differentiated competences: ability to intervene in complex processes, capacity of logical reasoning for the execution of the action in a universe which is more and more abstract, relational skills, transfer of knowledge and know-how in new, unknown situations.

- **The 'competence' factor**
  Some practices are being developed in the social field to respond to growing unemployment and the inability to find a job. Their aim is to guide people along the path of retraining and requalification. The main vector in this type of approach is the identification and capitalisation of acquired competences: skills audit, vocational guidance, validation and recognition of certificates and experience, upgrading of cross-cutting competences, focus on the cognitive development of persons, etc.

- **The 'learning process' factor**
  There is a growing tendency to view learning as a continuum, a path of new knowledge and competences built and rebuilt by the individual, in a succession of situations where the formal and the informal, the collective and the individual fuse to form a subtle combinatory whole.
  These three factors have two impacts on the conception and organisation of training:
  - a shift in the exercise of the training function which corresponds to a dual logic of integration:
    (a) integration of the objectives and practices of enterprise management which takes the form of monitoring, analysing and forecasting trends in employment, occupations and technologies, of attempting to rationalise the act of training (return on investment and economies of scale), a demand for quality in the process and its results.

31 Deret, E., *Rapport général*, Europrof, 1997

(b) Integration of the objectives and practices of the social field in terms of a skills audit, vocational guidance, analysis of practices and assistance for the formulation of projects.

- a forceful strengthening of the engineering and guided control of training measures characterised by a complexity consisting of six dimensions:
  (a) flexibility resulting from the connection between work and training situations and their constant interaction;
  (b) link between the individual and collective dimensions of the learning process;
  (c) multiplicity of actors in training (tutors, coordinators, promoters, etc.);
  (d) diversity of training modes, leading to the personalisation of training paths;
  (e) multiple location of training venues and activities, which elude formal structures and move closer to field work;
  (f) multi-temporality of the very act of training which takes place as close as possible to the situation of the enterprise or the needs of the individual.

The criteriological instrument approach

The developments in training which have just been described, are the manifestation of a profound change in the key factors and the role of initial and continuing vocational training in the present context of changes in the economy.

This change impacts on work, employment and the enterprise at the same time; its keyword according to Alain Lebaube[32] is 'disruption':

- disruption of work relations, whose traditional units of time and space have been shattered;
- disruption of employment itself: the only training which is valid today is the transmission of transferable skills in a determined field of activity;
- disruption, finally, of the enterprise which is a determining factor here: 'The enterprise now tends to recentre its attention on its core occupations and strategic competences, and to externalise all functions which can increase its potential for adaptation and development'.

This profound change in the key factors and the role of

32 Lebaube, A., seminar 'Eduquer pour Entreprendre', Fondation Cetelem, December 1997.

the training function necessitates a redefinition of the 'paradigm' of systems for the production of competences, parallel to the emergence of a new paradigm for the system organising occupational activities in their new environment.

But, the common site for this concurrent evolution of concepts and their proximity is none other than innovation, perceived and analysed in the interdependent relations between the areas of organisation, qualification or professionnality[33].

If we now take a look at the conclusions resulting from the foregoing analyses of the innovation process on the one hand, and the evolutions in the training function and their impact on training itself on the other, we observe a strong similarity in the parameters appearing in the three poles of the innovation/training/new information technologies triangle.

6.1 The innovation pole

The operative definition of innovation which is the outcome of this study can be comprehended through five complementary parameters:

- innovation is, in fact, a new combination of resources. It is not improvised, it becomes established in the course of a process consisting of three key phases: destabilising rupture, reorganisation of the parameters, production of a result. Consequently it is an organised process;
- the phenomenon is defined by its initiation and its outcome. It is thus a targeted process;
- it also defines itself as creativity, a creativity where the organised and the unorganised interact in a positive manner to arrive at new rules of the game, new outcomes unforeseen at the start. To innovate means, at the same time, to manage the phases of the process and to accept the element of the unknown, to accept the fact that the process itself will be creative. It is thus an organising process;
- in this sense, the management of innovation presupposes permanent intervention at three levels: the definition of the product, the definition of the process, the definition of the methods. It is thus a multidimensional process;
- in a process of this nature, the roles and the places of the different actors cannot be determined once for all. The process itself creates the actor. We are in the presence of a 'self-cre-active' process.

33 Lanciano, E., Maunce, M., Nohara, N., & Sylvestre, J. J., *L'analyse sociétale de l'innovation: genèse et développement*, document LEST 93/2.

6.2 The training pole

Training involves a combination of resources (human, technical, instrumental) with the aim of producing competences which are interwoven around the four key phases: analysis, conception, execution, evaluation. It, too, is an organised process.

The upstream and downstream phases in this set-up play an increasingly vital role, particularly with regard to evaluation as the instrument for the adaptation and regulation of the measures. Training, by adapting itself to the 'market', reinforces its characteristic as a targeted process.

We noticed above that training actions today develop under the influence of three trends: the transformation of work organisations into learning systems characterised by a very strong link between the work situation and the training situation; the recentring on the identification, development and capitalisation of competences; the progressive construction of individual and collective know-how in the progression of situations and opportunities. It is thus intrinsically an organising process.

In this connection, managing a training measure means the overall guided control of all the phases throughout the chain of events for the production of competences, it means determining methods and modes, constructing the outcome. Guided control here assumes the functions of monitoring and support. It is thus also a multidimensional process.

It goes without saying that this development simultaneously implies the wish to integrate the training function in the logic of work, and the subdivision of the training occupation between a multiplicity of actors in the training field (tutors, coordinators, facilitators, project leaders).

6.3 The information technology pole

The information and communication technologies are defined as the aggregate of available resources which, on their own, do not imply any training or innovative content: it is the combination of these resources in the process analysed above which endows them with the potential for training and innovation.

This package of resources is not neutral. Well mastered, it presents an important engineering tool for the implementation of flexible training measures by acting directly on three dimensions:

- the multiplicity of access modes to knowledge (multimedia);

- the multiple location of training venues (videoconference);
- multi-temporality, through the link between presence training and distance training, between the collective and the individual dimension, and through all forms of self-study.

In this sense, the information and communication technologies have a direct impact on the training process and the learning process:

- on the training process: role of the actors, link between presence training and distance training, time management;
- on the learning process: consideration of individual learning capacities and cognitive styles.

As Mr. Linard said[34], 'the information and communication technologies ... trigger reaction waves, more or less predictable, which compel a profound reexamination not only of the role, the functions and the conception of interaction between human beings and machines, but also of the overall structure in which they are embedded, and the objectives and methods of work and communication.'

34 Linard, M., *Des machines et des hommes: apprendre avec les nouvelles technologies*, Paris, L'Harmattan, 1996, 288 pp.

7

Conclusions

The homogeneity of the parameters to be found in the innovation and training poles leads to the identification of three fundamental postulates for the establishment of the reference framework for the problems to be studied:

- productive innovation should be managed as a process in the sense in which we have defined;
- the efficient training process should, on the other hand, be managed as an innovation;
- information and communication resources do not represent an innovation in the training process unless they stimulate all the elements of the system by strengthening its degree of cohesion, unless they produce foreseen or unforeseen results which can increase the efficiency of the overall structure, thus providing proof of their 'paradigmatic' capacity, i.e. their capacity to lend themselves to analysis and modelling.

In other words:

- How is the technological tool of information and communication rooted in the analysis of the environment and situations phase? How and to what extent does it enrich this phase by adding a new dimension?

- Why is it integrated in the design of the training measure, in its objectives and its organisation? How are its functionalities and specificities taken into account at this stage?
- How does it incite and develop the mobilisation of the actors at all levels of the training process?
- In what way does it act on the combination of resources and teaching arrangements (modes, venues, pace) in order to produce the expected competences?
- How does this introduction change the guided control of the process and its support instruments? How does it enhance the quality of monitoring?
- How is this measure the subject of evaluation? How does the 'return on investment' operate? How does this regulation intervene? How does it affect the phases of the process?

We think that this approach provides an adequate framework to establish the criteria we wish to apply, case by case, by starting from a dual recommendation:

- first recommendation: a training practice integrating the new technologies may be considered an innovation when it affects and supports the training process as a whole, to the point of transforming the very conception, the actors and the results.
- second recommendation: it can be considered a transferable innovation when the value added that it represents has been suffic.. ntly integrated in the original system to impact on other systems with due consideration of their specificities.

8

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TTnet Dossier No 1

Trends in the development of training and the role of innovation as a transferable practice

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In 1998 Cedefop created the *training of trainers network* (TTnet) as a Community forum for communication, cooperation and expertise in the field of training for teachers and trainers of vocational training. This forum focuses on innovation and seeks to meet real needs from a 'market' perspective.

The TTnet Dossiers are intended to ensure that the outcomes of the various projects conducted by the TTnet are available to the different players in the field of the training of trainers: policy-makers, research and documentation centres, and trainers' professional bodies, thereby contributing to the Community debate about the training of trainers.

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Dossier No 1 on the development of training professions and the role of innovation as a transferable practice brings together different works – presentations and studies – carried out as part of the TTnet network's activities during the period 1998-2000. The works were selected for their topicality and for their contribution to the Community debate on the theme of this first Dossier.

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